RUBBER WORLD

FEBRUARY 1, 1942

Newsletter No. 2 *PUBLISHED BY RUBBER CHEMICALS DIVISION OF* DUPONT *FEBRUARY 1942*

Conservation of Raw Materials and Production Time of Vital Importance to Rubber Industry

CONSERVATION of raw materials is the watchword of today—as it should be tomorrow when the emergency is over. In general, all rubber chemicals are conservation agents. Their use has reduced manufacturing costs and conserved rubber by preventing waste due to scorched stock. Further, the proper use of rubber chemicals results in higher quality stocks which last longer and need replacement much less frequently.

THE RPAs save badly needed time and equipment by increasing rubber breakdown speeds and improving processability.

The following results were obtained in the manufacture of carbon black masterbatch using 75 pounds of smoked sheets and 50 pounds of channel black:

PROCESS	*Time for Operation* With 0.25% RPA	No RPA
Masticate 75 pounds crude rubber	4 min.	12 min.
Rest or aging period	0	24 hours
Incorporate 50 pounds channel black	12 min.	20 min.
Mixing time 125-pound masterbatch	16 min.	32 min.

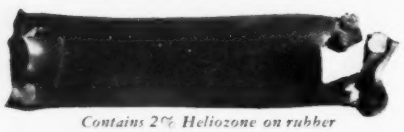
HELIOZONE PREVENTS SUNLIGHT DETERIORATION The normal life of products exposed to sunlight in service can be materially extended by including Heliozone in the compound. Accelerators and anti-oxidants, regardless of type, have very little effect on the sun-checking resistance of stretched rubber. A material, opaque to sunlight, that blooms to the surface will provide such protection.

Heliozone is a special blend of waxes that bloom to the surface of a cured rubber article, forming a smooth, continuous, transparent film that remains plastic even at 0°F. As the film does not dissolve in the rubber at high temperatures, Heliozone provides year-round protection.

For most purposes, satisfactory protection is obtained by the use of 0.5% Heliozone on the rubber; however, for maximum protection or in highly loaded stocks up to 2.0% on the rubber should be used. As Heliozone is not an antioxidant, Neozone A or another good antioxidant should be used with it.

Figure I illustrates photographically the superior sunlight resistance of a dark-colored stock containing 2.0% Heliozone on the rubber over the same stock without Heliozone. Both samples were stretched 50% and exposed to direct sunlight for 5 months.

FIGURE I



Contains 2% Heliozone on rubber

Contains no Heliozone

NEOPRENE All neoprene compositions are inherently superior to similar rubber stocks in resistance to deterioration by sunlight.

As can be seen from Figure II, the rubber jacketed cable (left) was badly cracked after

FIGURE II

Power Cable Exposed to Sunlight

Rubber Covered Exposed 13 Months — *Neoprene Covered Exposed 26 Months*

13 months exposure to sunlight; the neoprene jacketed cable (right) showed no signs of cracking after exposure for 26 months.

RETARDER W inhibits precure and scorching of thiuram and benzothiazole accelerated stocks at processing or storage temperatures. Many chemicals are known to inhibit vulcanization of rubber at all temperatures. However, Retarder W is a true retarder because it improves safety at processing temperatures but is a mild activator at curing temperatures.

One quarter to one half as much Retarder W as accelerator should normally be used. The effectiveness of Retarder W is reduced by the presence of alkali reclaims and it activates the thiazoline accelerator 2-MT.

Through the Mill

NEOPRENE TYPE CG *should be used for adhesive cements. It gives:*

1. *Strong initial bond.*
2. *Rapid rate of cure or set-up at room temperature.*
3. *High permanent bond strength when fully cured.*

USE ACCELERATOR 833 *to cure neoprene cements at room temperature. See recommndations on page 3 of informal report entitled "Neoprene Type CG."*

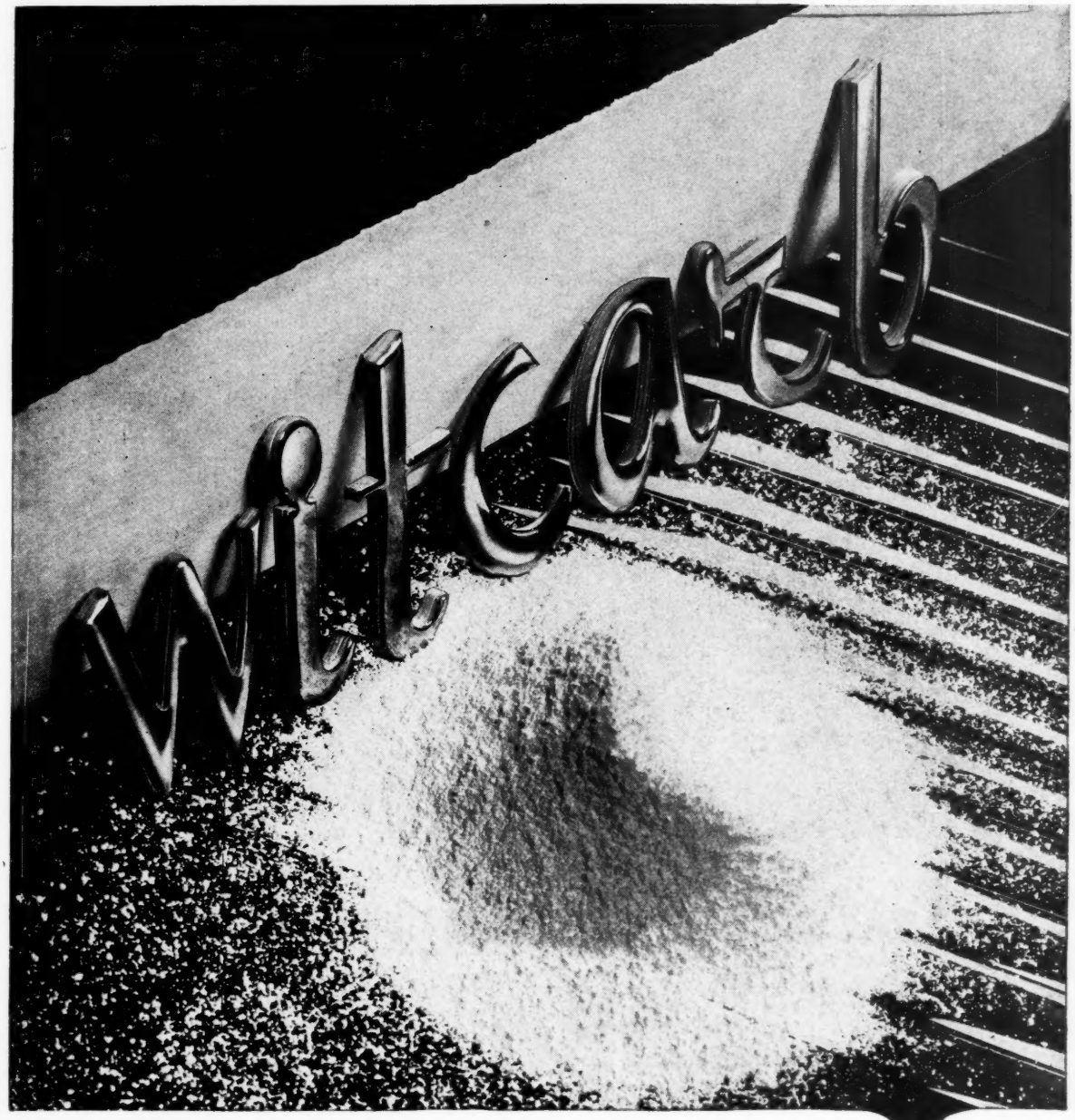
RUBBERIZED FABRICS, *either calendered or spread, may be efficiently, safely and economically cured in the roll instead of in festoons. For information and suggested compounds see informal report entitled "Roll Curing of Rubberized Fabrics."*

ACCELERATOR 808 *gives excellent results in stocks in which all the rubber hydrocarbon is in the form of reclaimed rubber. Thionex-litharge, Zenite-litharge, and Zenite B are also recommended in this type of compound.*

HELIOZONE *will improve the appearance of products containing reclaimed rubber. Use it for this reason as well as for sun-checking resistance.*

The Neoprene Notebook carries up-to-date information on new uses for neoprene. Ask to get on the mailing list.

INDIA RUBBER WORLD, February 1, 1942, Vol. 105, No. 5. Published monthly by BILL BROTHERS PUBLISHING CORP., 420 Lexington Avenue, New York, N. Y., U. S. A. Entered as second class matter October 5, 1889, at the Post Office at New York, N. Y., under the act of March 3, 1879. Subscription, $3.00 a year domestic; Mexico, $3.50; all others, $4.00; single copies, 35 cents.



IF you are producing rubber products in which high tensile and modulus and tear resistance are important, you will be interested in Witcarb, a new white reinforcing filler that offers special advantages in formulas that demand these properties. Witcarb deserves your attention not only because of its special merit as a white reinforcing filler, but because its low price presents an opportunity to economize while at the same time improving quality. Information on the properties of this new product is available on request. Fill out and mail the coupon, and the facts will be sent to you promptly. Use the coupon also to obtain your copy of WITCO PRODUCTS.

WISHNICK-TUMPEER, INC.

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WISHNICK-TUMPEER, INC.
295 Madison Avenue, New York, N. Y.

Gentlemen: Please send me a free copy of WITCO PRODUCTS. I am interested in the following:

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- ☐ Witco Magnesium Carbonate
- ☐ Witco Blanc Fixe
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- ☐ Witco Carbon Blacks

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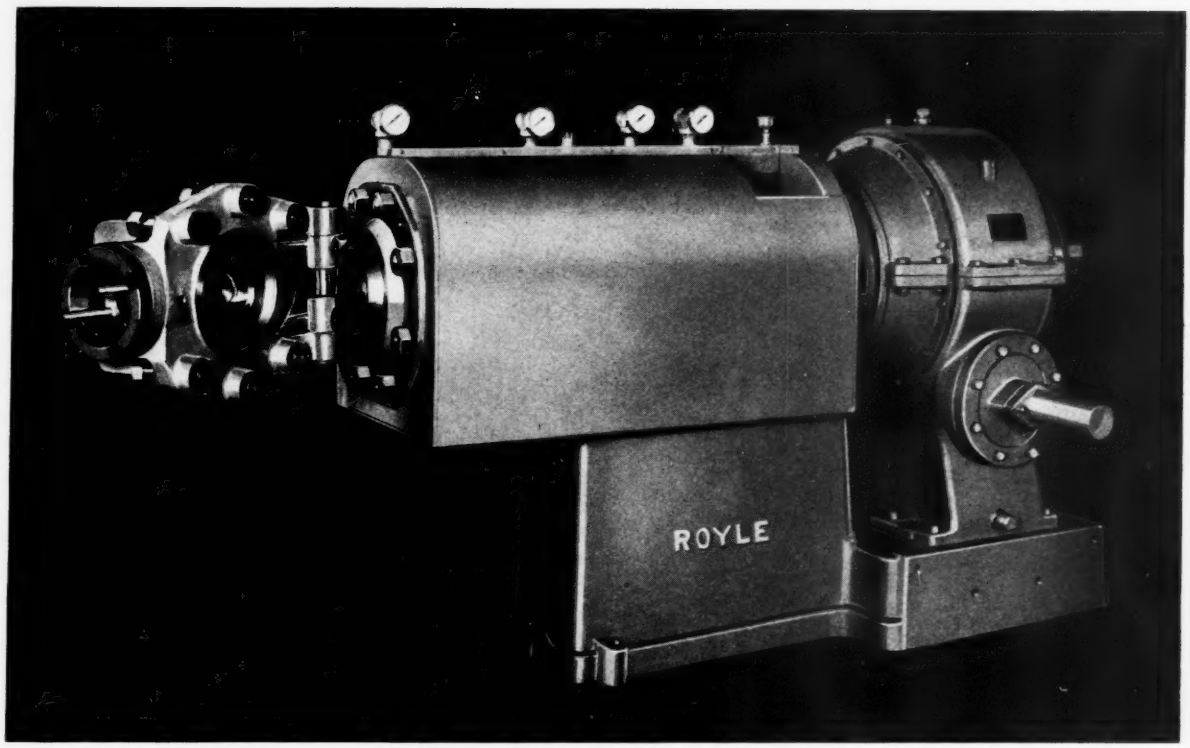

THE ROYLE 6" PLASTICS INSULATING EXTRUDER

TRACKING DOWN DELAYS

Delays in materials and production — arch enemies of our defense effort — are being systematically done away with at John Royle & Sons. It is stern business — calling for stern measures — and great strides are being made in the right direction.

But until our present emergency is past, we can expect delays — disappointments and curtailment of some industries. To our many good friends and customers, we want to pledge our efforts in holding these delays to a minimum. When they must occur, we ask your understanding cooperation.

John Royle & Sons *Since 1855*

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AKRON, J. C. CLINEFELTER • • LONDON, JAMES DAY (MACHINERY) LTD.

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If you have spare or worn Banbury parts write us at once . . . We will pay cash for them . . . Remember, too, you will be serving a patriotic cause by helping maintain some other Banbury on the production line.

★

The needs of a Nation at war demand the MOST your equipment can produce . . . A *Guess* that your Banbury will come through on a full-time mixing schedule won't maintain it at TOP efficiency . . . Now is the time to KNOW that it will do its part . . . Our skill and knowledge of Banburys, from years of re-building and repairing, can give you definite assurance of *dependable, top-speed* mix production . . . Call for a check-up today—it may prevent a time-wasting slow-down or a disastrous break-down in your part of the essential war production program. We are geared up to give speediest service in re-building and hard surfacing Banbury Mixers.

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9 TONS EQUALED 10

SUN RUBBER PROCESSING OIL *saved more than 10% of crude stock*

Every pound of rubber *must* be conserved now . . . and conservation can start with you as the compounder!

In rubber manufacturing plants throughout the nation SUN Circo Light Processing Oil is making possible a saving of tons and tons of crude rubber. On regular production runs leading compounders have saved more than 10% of their crude rubber stocks —in experiments they have proved savings as high as 20%.

Start today! In your own plant, under your own operating conditions prove SUN Circo Light Processing Oil makes it possible to:

- **produce more goods from crude rubber on hand.**
- **use larger percentages of inert material**
- **maintain quality and desired physical characteristics**
- **reduce cost of compounding**
- **make processing easier**

Check with a Sun "Doctor of Industry" today on the practicability of revising your formula to stretch rubber stocks and speed-up production. Write

SUN OIL COMPANY • PHILADELPHIA

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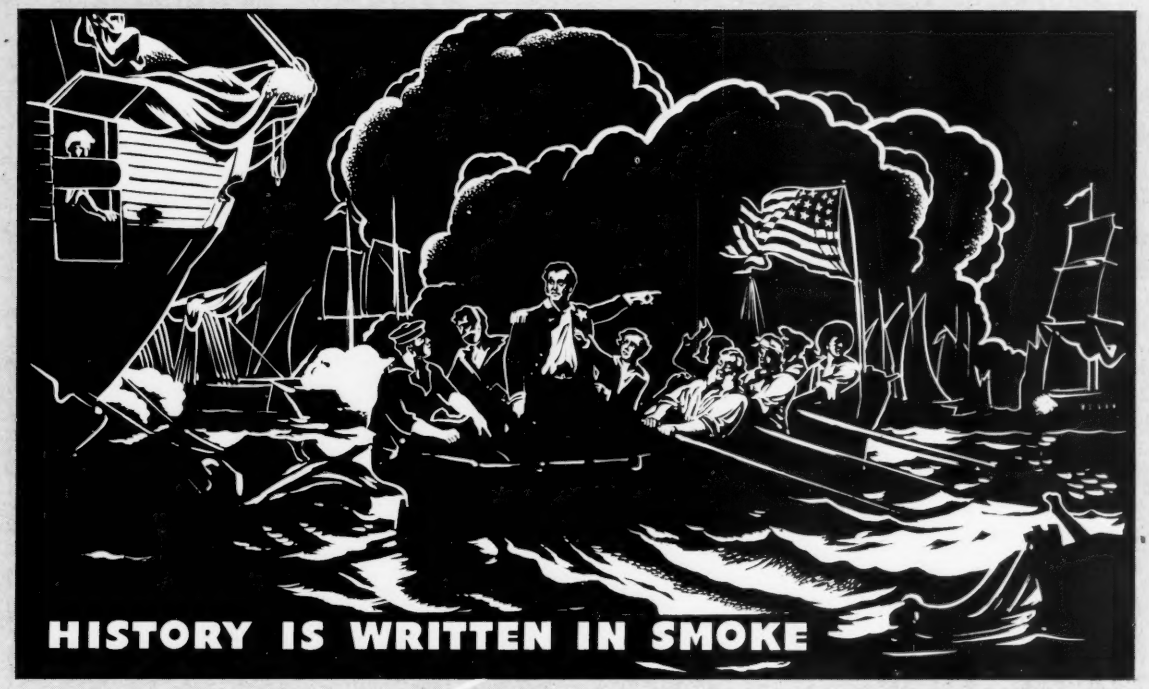
SUNOCO

SUN PETROLEUM PRODUCTS.. HELPING INDUSTRY HELP AMERICA



1813 . . . The Battle of Lake Erie

The American victory on Lake Erie, which blocked an impending invasion from Canada, was decided by as brave a deed as ever thrilled the nation. When Commodore Oliver Hazard Perry's flagship was reduced to total wreckage, Perry went over her side to a small boat . . . boarded the brig "Niagara", and swept the enemy with broadsides until they struck their colors.

THE saga of our nation, written in the smoke of industry and the blaze of battle, is a saga of countless men and machines and material schooled for their vital tasks.

The story of Atlantic Carbon Black, too, is the story of a product "schooled" for its tasks . . . so dependably manufactured that it has become almost a traditional compounding material for some of the greatest firms in rubber.

ATLANTIC CARBON BLACK

MANUFACTURED BY

CHARLES ENEU Johnson AND COMPANY

DISTRIBUTED BY

The C. P. Hall *Co.*

AKRON • BOSTON • LOS ANGELES • CHICAGO

Geared for Action!

We're shifting our gears as demanded by the present emergency where utmost service in the supply of scrap rubber is concerned.

The accumulative experience of forty years in the industry stands us in good stead at this critical period.

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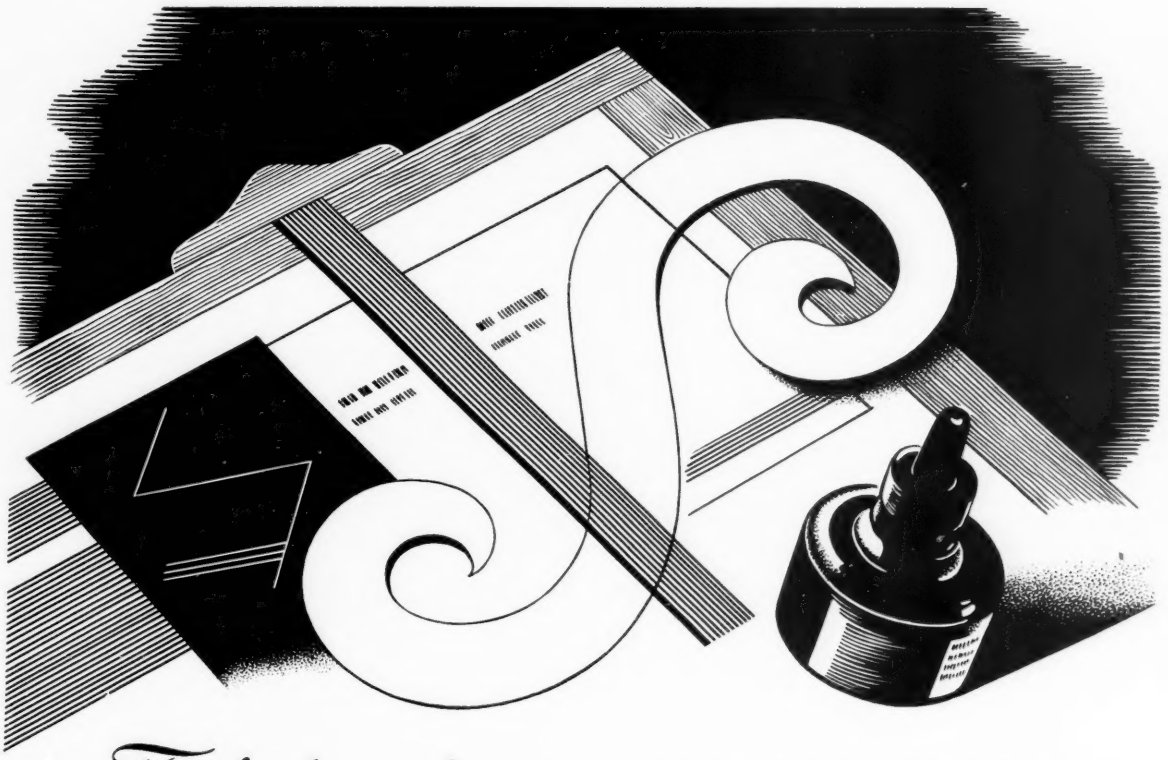

To help plan BETTER PRODUCTS

We draw on YOUR imagination. Into the retort go your dreams, your hopes, your aspirations. Out of it, with amazing regularity, come finishes with specified characteristics. Finishes hitherto unknown. Finishes conceived by your imagination . . . created by Stanley experience.

Into the finish of your product should go the same inventive talent, engineering skill and productive genius which you have poured into the product itself. A better product demands a better finish.

So give your imagination free play. Tell us about the finish you really want . . . its characteristics, its appearance, its application, even its cost. Stanley research has reduced many such hypothetical specifications to specific formulae. It is quite possible, in fact, that among our thousands of recorded formulae is one which ALREADY meets your requirements.

Your inquiry incurs no obligation. Address Department "B".

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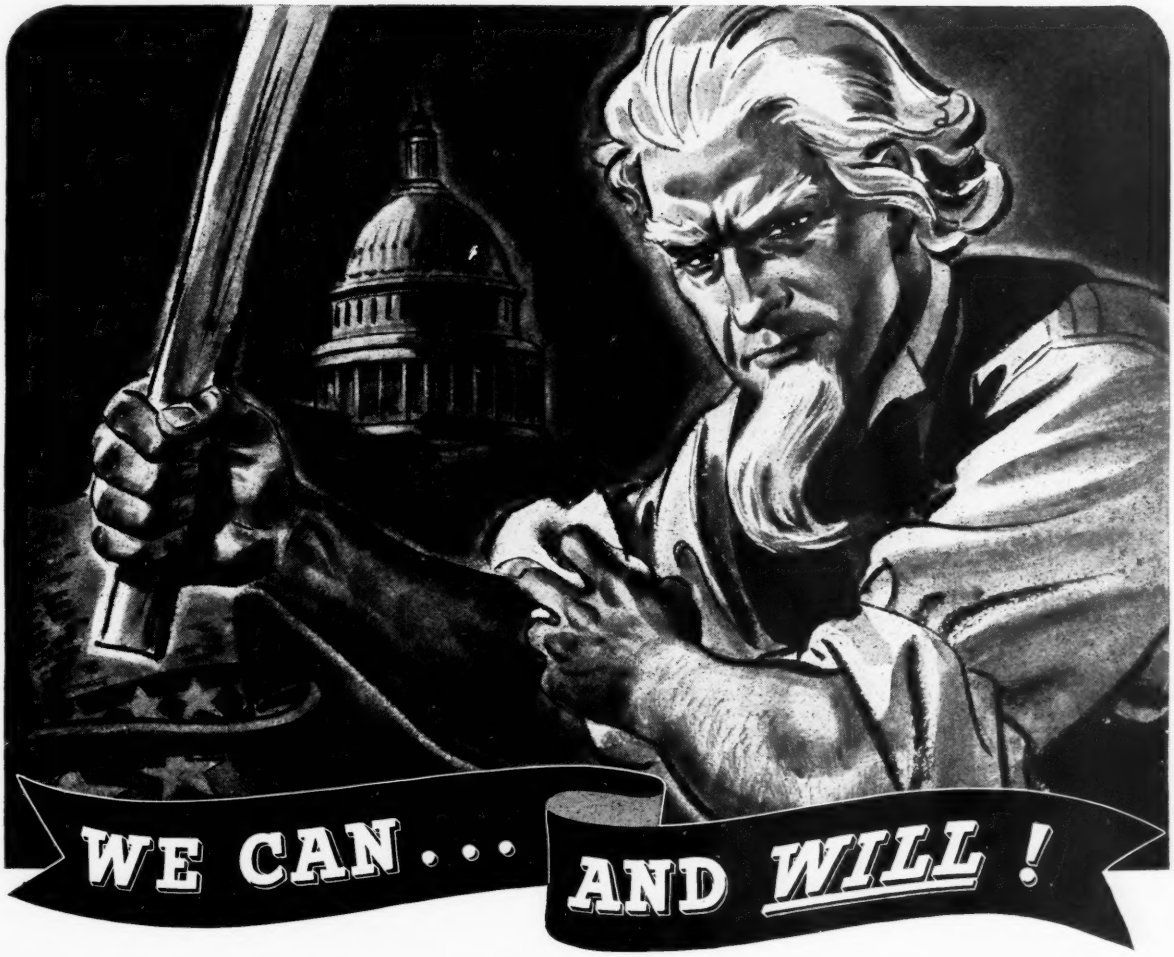


THESE DAYS call for all-out effort—effort that not only does its best, but that *succeeds* in *accomplishing* its purpose.

Your need for solvents is not modified by "maybe" or "perhaps." *You've got to have them!*

We know this because of our years of experience in working closely with your business and many others similar to yours. Thus when you order Skellysolve, *we get it to you.* The present emergency strengthens our determination to do that—and keep on doing that. Phone, write, or wire. We can . . . and *we will.*

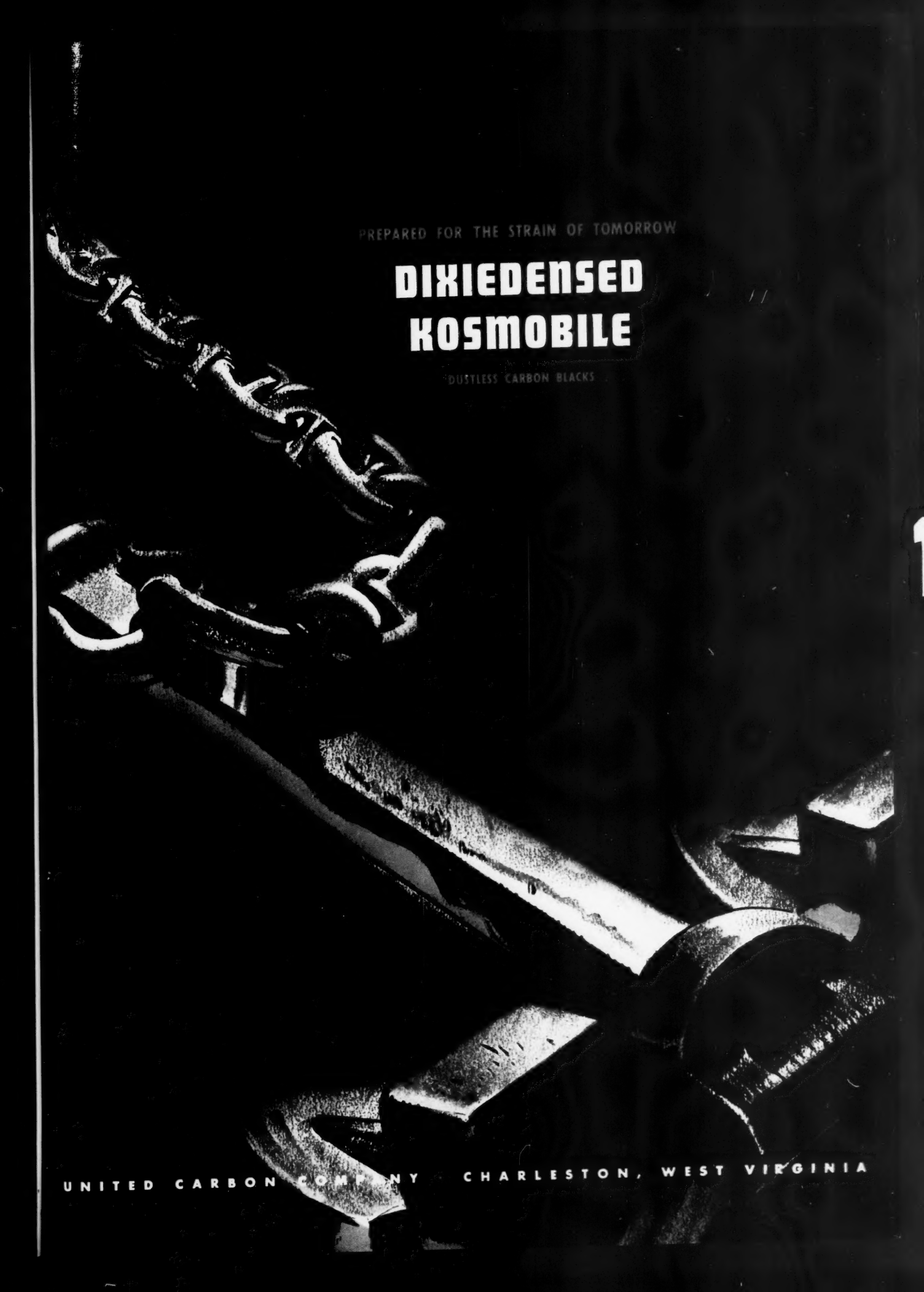
SKELLY

SKELLYSOLVE
in the
RUBBER INDUSTRY

There are six different types of Skellysolve which are especially adapted to various uses in the rubber industry, for making rubber cements, and for many different rubber fabricating operations. Skellysolve offers many advantages over benzol, rubber solvent gasoline, toluol, carbon tetrachloride, etc. It will pay you to investigate Skellysolve. Write today.

SKELLYSOLVE

SOLVENTS DIVISION, SKELLY OIL CO.
SKELLY BLDG., KANSAS CITY, MO.


PREPARED FOR THE STRAIN OF TOMORROW
DIXIEDENSED
KOSMOBILE
DUSTLESS CARBON BLACKS
UNITED CARBON COMPANY CHARLESTON, WEST VIRGINIA

DIXIEDENSED AND KOSMOBILE STAND FOR THE HIGHEST DEVELOPMENT IN BLACKS FOR RUBBER COMPOUNDING. PRODUCTS COMPOUNDED WITH THESE BLACKS ARE ABLY PREPARED FOR THE STRAIN OF TOMORROW.

In industry all over the country today, Mt. VERNON fabrics are helping defense. Never have our mills produced more goods, yet there has been no let down in their splendid record of on-time deliveries. Under the pressure of tremendous demand for duck and yet more duck, their quality standards have never wavered. Buy Mt. VERNON fabrics and be confident of their unchanged quality and prompt delivery.

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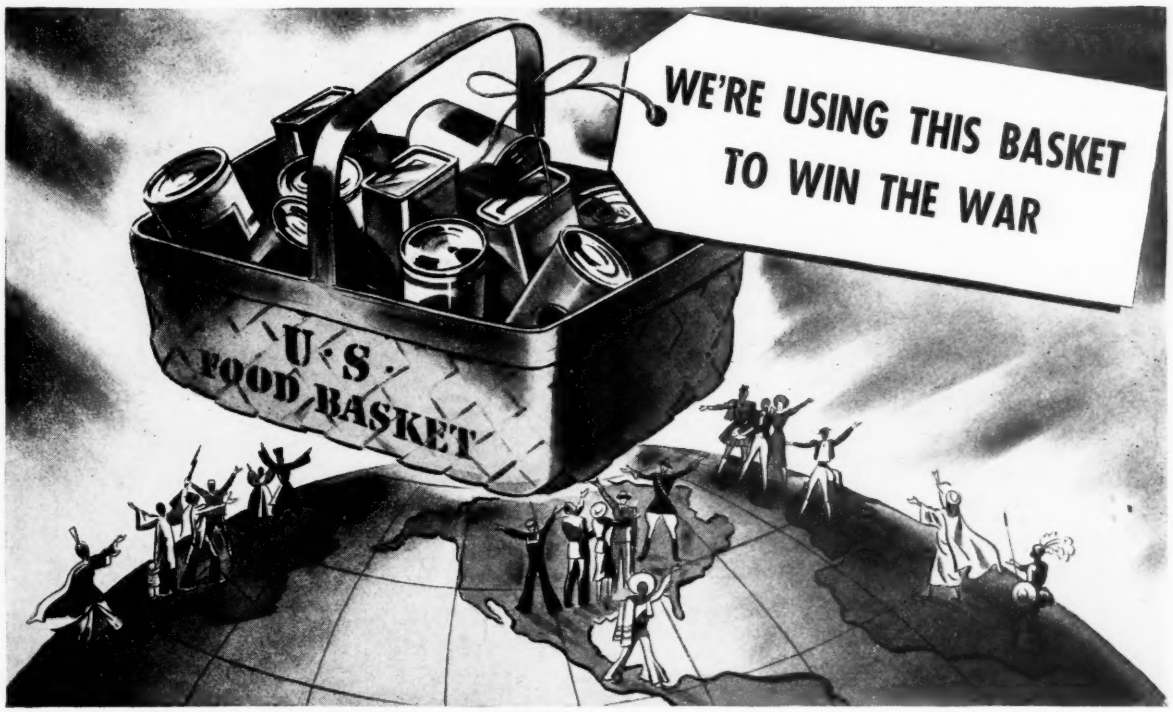
One of a series of advertisements telling how American Industry is speeding up production



Taylor Instruments are helping to keep it filled!

IT'S AMERICA'S JOB to furnish the food that will help win the war. We've got to feed millions of fighting men (our own forces, even now, are eating 9 million pounds of food a day!). We've got to feed the American people. It's our giant's job to supply much of the food that our war allies will need—now, and afterwards. The U. S. food basket must be bottomless and brimming over.

A great part of these billions of pounds of food will have to be good foods in cans. It can be supplied—because this nation's food industry can turn out fine canned foods fast. The majority of instrument-controlled food plants in the United States are Taylor-equipped. Taylor Instruments automatically control temperatures and pressures, and hold them to a precise processing schedule. Temperatures can't jump too high, overcooking and destroying food values—or slump too low, improperly sterilizing the food. Fluctuating pressures during the cooking don't get the chance to damage cans and contents.

Food plants working on Government contracts have stepped up their production greatly during the last few months by adding hundreds of Taylor-controlled retorts and cookers to their production lines. These headlines will give you a glimpse:

Midwestern Packing Plant Installs Taylor Control Systems to Convert Thousands of Hogs Each Week into Hundreds of Thousands of Pounds of Canned Luncheon Loaves, Sausages, and Other Pork Products

In Another City Same Packer Installs Taylor Control Systems in New Plant That Will Pack 1,000,000 Pounds of Meat Weekly

Plant Puts Large Number of Taylor-controlled Retorts into Production to Process ½ Million Pounds of Pork Per Week

And Government quotas for canned vegetables in 1942 are being stepped up nearly 100%! Throughout the whole food industry, Taylor Instruments will be doing the biggest job ever, in 1942.

You probably have the same problem the food people have — meeting rigid Government standards of quality, quantity, price. You *can* meet them, by using Taylor Instruments in processing *your* product. Taylor Instruments will help *you* produce top quality at top speed. Taylor Instruments will help *you* cut costs and prevent waste—to assure profits in these times of pegged prices. Taylor Instruments will help solve a shortage of man-power—they work automatically, precisely, tirelessly.

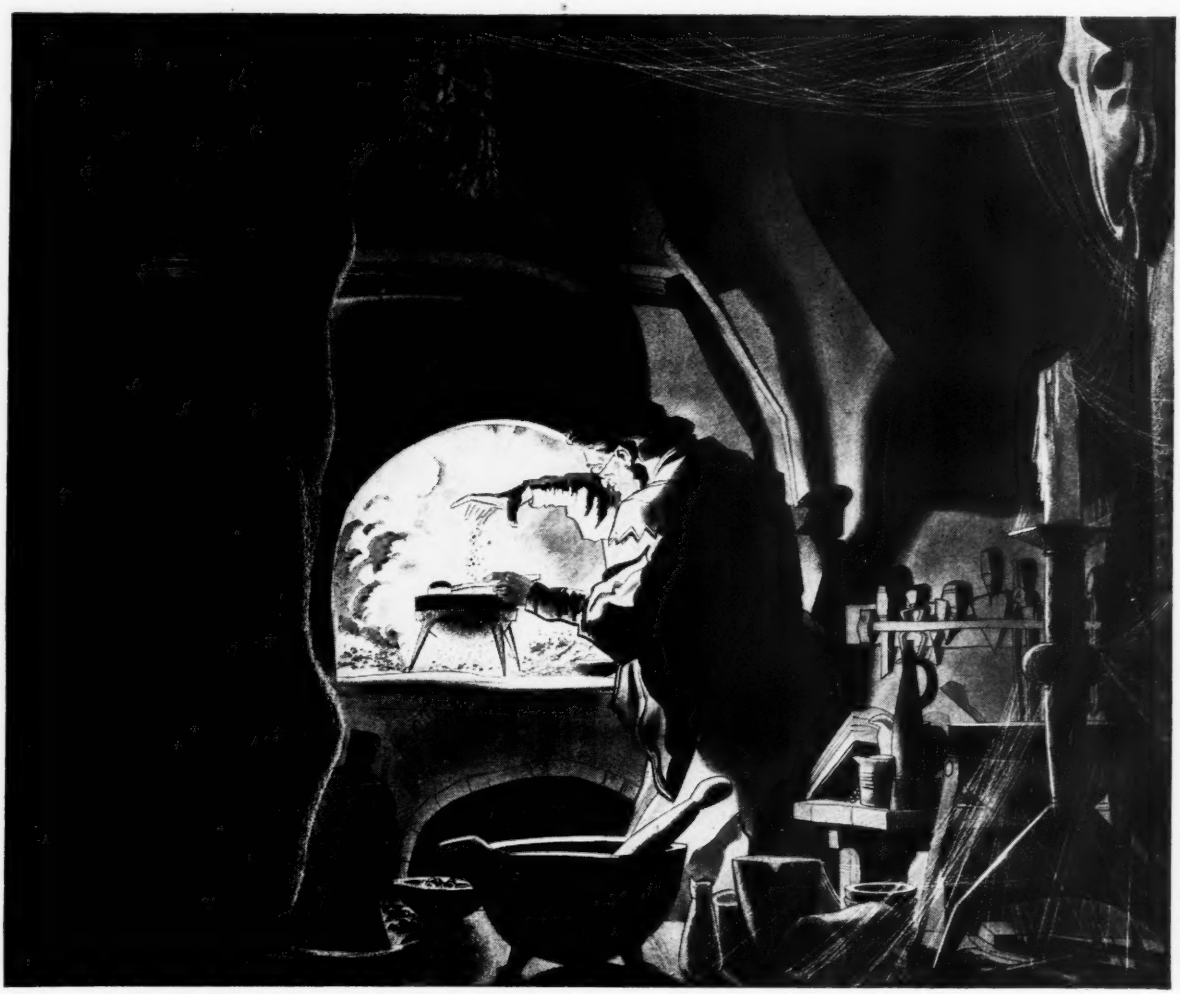
Every American Industry today needs the assistance of Taylor Instruments in speeding up *all* production. Taylor Instruments should be helping you do *your* part toward winning the war. What are your specific needs? Let us help *you*. Taylor Instrument Companies, Rochester, N.Y., and Toronto, Canada. Makers of the famous "Not 1 but 5 Fulscope Controller."

Taylor

Indicating Recording Controlling

TEMPERATURE, PRESSURE, FLOW *and* LEVEL INSTRUMENTS

★ KEEP ON BUYING U. S. DEFENSE BONDS AND STAMPS ★



HE WOULD HAVE BURNED FOR THIS DISCOVERY!

WITH none but his cat to watch him, the alchemist in the Middle Ages worked at peril of his life, exploring the secrets of nature.

He was the father of modern chemistry. His quest was the "Philosopher's Stone"—a magic substance to change common metals into gold. But had he discovered wonders to compare with the miracles wrought by the modern chemical known as "Cumar"*... he would have been burned at the stake for trafficking with the devil.

For Cumar—a paracoumarone-indene resin developed by Barrett and put to use by progressive chemists and chemical engineers—has given amazing new qualities to hundreds of everyday articles from mastic floor tiling to rubber tires.

On rubber, Cumar confers new life and stretchability. And unlike many compounding agents, it blends equally well with natural or synthetic rubber—a characteristic of special significance today.

* * * *

This modern "Philosopher's Stone" is just one of a long list of coal-tar chemicals that have established Barrett's reputation for uniform, dependable products.

Perhaps you have a product that can be improved, a production schedule that can be shortened, or manufacturing costs that can be pared through the use of a coal-tar chemical. We invite you to drop a line to our experienced Technical Service Bureau, outlining your problem.

THE BARRETT DIVISION
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Barrett Chemicals for the Rubber Industry: Carbonex*... Carbonex*S ... Carbonex*S Plastic ... Cumar*... Bardol*... Bardol*B ... Bardex*... B.R.H.* No. 2 ... B.R.T.* No. 7 ... B.R.V.*... S.R.O.*... Reclaiming Oil No. 1621... B.R.C.* No. 19E... Dispersing Oil No. 10... Resin C*Pitch

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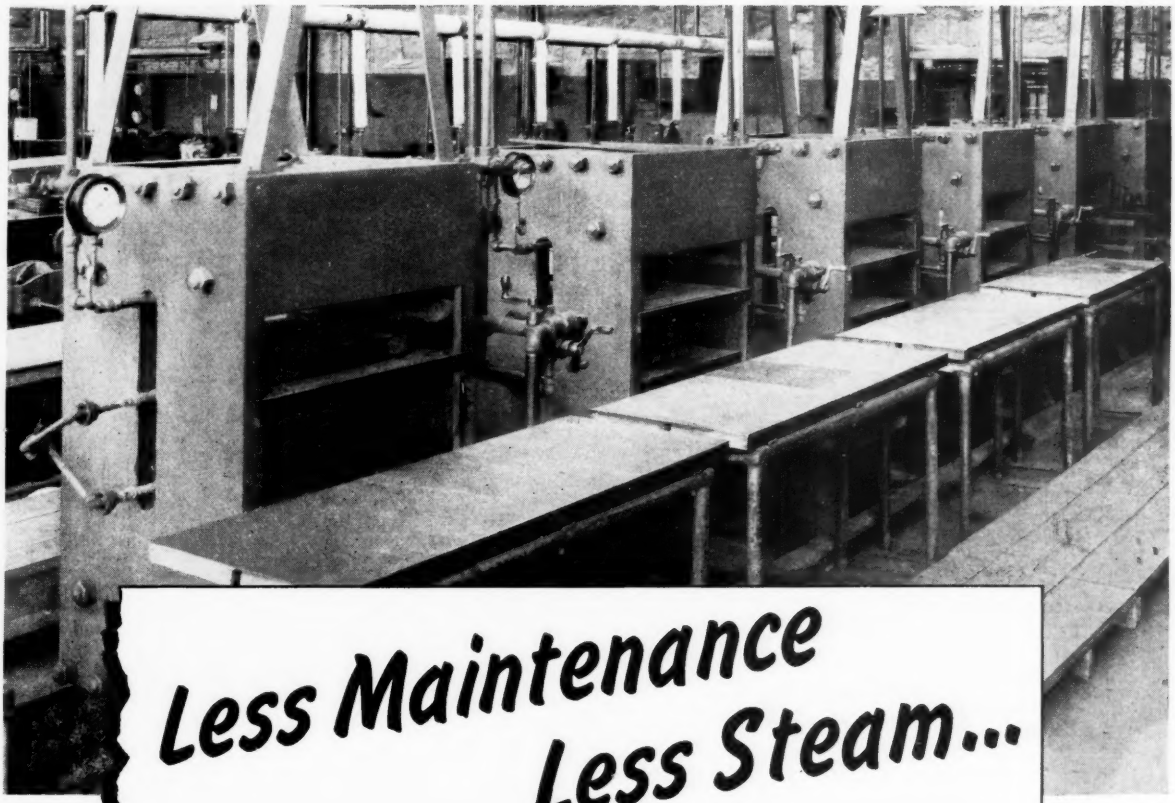

Less Maintenance Less Steam...

with these SOUTHWARK HYDRAULIC PRESSES

Says the Jos. Stokes Rubber Company

Lower maintenance, less steam and neater appearance are three of the reasons why the Joseph Stokes Rubber Co., prefers these Southwark steam platen presses for hard rubber molding.

Southwark side slab presses confine heat within the molds and steam plates; assure positive guiding and greater rigidity.

This is but one of many types of Southwark Hydraulic Steam Platen Presses engineered to meet today's requirements in rubber and plastics manufacture. When you're planning new plant equipment for the competition of tomorrow it will pay you to specify Southwark.

Baldwin Southwark Division, The Baldwin Locomotive Works, Philadelphia; Pacific Coast Representative, The Pelton Water Wheel Co., San Francisco.

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THE BALDWIN LOCOMOTIVE WORKS · PHILADELPHIA

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CONTINENTAL
Weather Control helps you produce
BETTER RUBBER

What has weather to do with carbon black? Or the quality of rubber production?

Surprisingly, it has a great deal to do with both. For changes in weather—shifts in wind direction or velocity, drops or rises in temperature, rain, sleet, snow—upset the even flow of air in the burner houses in which the black is produced. This in turn affects the uniformity of the black—and consequently of the rubber in which it is used.

Heretofore, weather has been an uncontrollable factor throughout the carbon black industry. But now, thanks to ISOTHERMAL CONTROL, a new and exclusive Continental development*, it has been offset as a variable at Continental. By regulating and maintaining an even balance of draft and temperature within the burner houses, regardless of outside weather conditions, ISOTHERMAL CONTROL assures a better, more uniform black than has ever been possible before in the industry. This greater uniformity is definitely reflected in the quality of the rubber in which it is used. Test after test prove the superiority of the black produced by this method—and now all 366 burner houses at Continental are under ISOTHERMAL CONTROL.

This forward step follows fast on the heels of Continental's new and more practical system of grading, which has proved of great value to black users. Use Continental's ISOTHERMAL CONTROLLED CARBON BLACK to improve the quality of your compounding.

TESTED AND PROVEN! To determine the effectiveness of this control under varying weather conditions, one unit in the Continental Plant was operated for 30 days with the control and 30 days without the control. Frequent samples of the product were taken each day and tested with the D. P. G. adsorption test. The following statistical results indicate the definite superiority of ISOTHERMAL CONTROL:

	With Control	Without Control
Average D. P. G. Adsorption..	48.54	48.35
Maximum + Deviation...	2.83	4.85
Maximum — Deviation...	3.79	7.25
Average Deviation.....	1.04	2.23

*Patent Applied For

CONTINENTAL CARBON COMPANY • 295 MADISON AVENUE • NEW YORK, N. Y.

Akron Sales Office: Peoples Bank Building, Akron, Ohio • Plant: Sunray, Texas

SALES REPRESENTATIVES

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February 1, 1942

VOLUME 105 NUMBER 5

A Bill Brothers Publication

INDIA RUBBER WORLD

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Published monthly by Bill Brothers Publishing Corp., 420 Lexington Ave., New York, N. Y. Chairman of Board and Treasurer, Raymond Bill; President and General Manager, Edward Lyman Bill; Vice Presidents, Randolph Brown, B. Brittain Wilson.

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Subscription price—United States and Mexico, $3.00 per year; all other countries $4.00. Single copies thirty-five cents. Other Bill publications are *Premium Practice, Rug Profits, Sales Management, Soda Fountain, Grocer-Graphic,* and *Tires.*

INDIA RUBBER WORLD

Published at 420 Lexington Avenue, New York, N. Y.

Volume 105 | New York, February 1, 1942 | Number 5

Resistoflex PVA Supplements Synthetic Rubber Supplies

E. S. Peierls[1]

First step in making Resistoflex PVA hose is milling the compound to produce a continuous uniform strip. Here an operator uses a micrometer on the milled sheet to check thickness, held to plus or minus 0.001-inch.

WITH natural and synthetic rubber strictly rationed for the most vital war uses, interest in other rubber-like synthetic resins has increased greatly since December 7. Among these rubber-like compounds Resistoflex PVA stands out as one of the most interesting, especially for applications requiring great tensile strength, resistance to vibration and flexing, and inertness to gasoline, oil, and organic solvents, including the aromatic and chlorinated hydrocarbons, or where a material having a negligible permeability to solvents or gases, military or commercial, is indicated.

Commercial Development

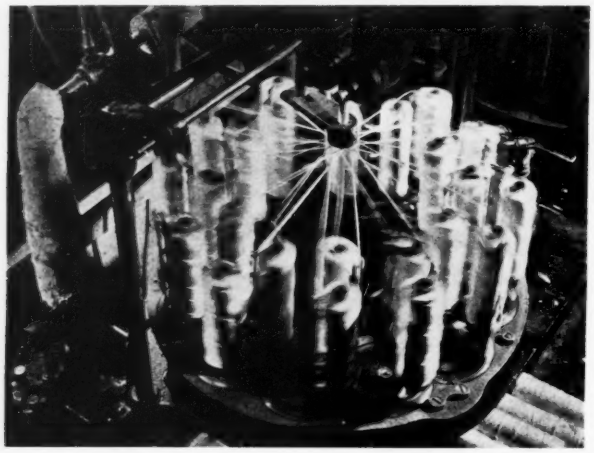
Resistoflex PVA material has been compounded and processed during the past several years by Resistoflex Corp. Hose and tubing of various kinds have been the main product manufactured, but a substantial market has also been created for molded sheets and other mechanical molded goods such as gaskets, washers, diaphragms, and more recently for gloves, work aprons, and various types of solutions and paints.

Hose assemblies have been sold direct to equipment manufacturers, with automotive replacement items distributed through automotive jobber channels. Hose in bulk, or for plant maintenance, sheet material, gloves, and work aprons have been made available to selected rubber jobbers.

A complete range of product constructions has not been offered to jobbers because the characteristics of the material do not lend themselves to the construction of all types and sizes of hose, molded goods, gloves or aprons. For the rubber jobbers, therefore, Resistoflex PVA prod-

The milled sheet feeds into the extruder in continuous lengths and emerges as a seamless, flexible tube. Because of the translucence of the tubing, the operator can maintain a constant check on quality as as well as dimensions.

[1] President Resistoflex Corp., Belleville, N. J.



High-speed braiders apply the reenforcing layers of cotton or wire.

ucts constitute an attractive line of high-quality specialties which can be used to supplement their sales of rubber and synthetic rubber products.

Availability to Rubber Manufacturers

With United States' entry into the war Resistoflex officials announced their willingness to make available to rubber manufacturers engaged in defense work semi-finished products, and in particular molded sheet material, which can be remolded into a wide range of mechanical molded goods.

Resistoflex PVA material is technically neither a rubber nor a synthetic rubber, or is it a rubber substitute. But in a great many applications Resistoflex PVA material has shown itself to be an equal or superior replacement for many of the synthetic rubbers. To the extent that it is used for new applications, supplies of synthetic rubber can be freed for other vital uses. To evaluate these possibilities a clearer understanding of the material and the technique required for its processing is essential. This point is particularly true because very little factual information has appeared in trade or technical literature.

Processing Characteristics

The various Resistoflex PVA compounds are made from a finely bolted white to pale amber resin which, until compounded and partly processed, is neither thermoplastic nor thermosetting. It differs from rubber or synthetic rubber in that it does not require breaking down on a mill or vulcanization. Its actual transformation into a tough, strong, flexible, and resilient material takes place during the extrusion or molding processes. Both of these, as well as the preliminary mixing and milling, differ considerably from those employed for rubber although the equipment used is very similar. In milling, for example, the customary blanket is not built up on one of the rolls. Instead a thin and cohesive ribbon is produced which has not yet completely fused and is not at all comparable in consistency to either milled or calendered rubber stock.

Careful control of each operation is one of the secrets of compounding and fabricating Resistoflex PVA materials. Solvent loss during processing is held within a range of plus or minus 0.1%; thickness of the milled sheet or ribbon is held within tolerances of plus or minus 0.001-inch; control of extruder temperatures is held to plus or minus one degree at three different points, one of which is at the dies where this control is automatic.

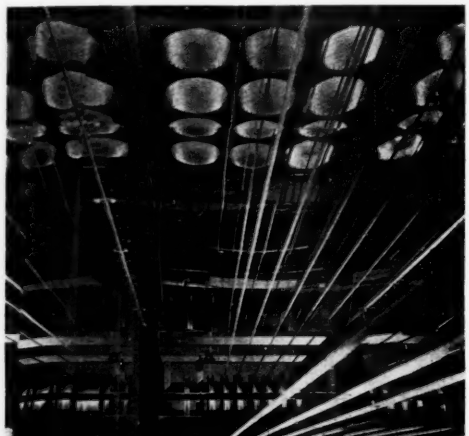
Braiding, jacketing, and covering require the same careful control. Holding of inner diameters within close tolerances was facilitated by the development of a patented process of braiding on the inside of a specially designed grommet and, where rubber or synthetic rubber is used as jacket or cover, standardization has made it possible to secure good friction and complete vulcanization of the rubber or synthetic rubber layers.

In developing the entire technique great stress was laid on so preparing the semi-finished products that further handling by rubber companies is today possible on standard rubber equipment and at the regular temperatures and pressures. The semi-finished sheet material available to the rubber industry can readily be stamped into blanks and remolded in flash-type or semi-positive type of molds. Fabric inserts or other types of reenforcements can also be used. Standard compounds of varying durometer hardnesses are available as well as special compounds.

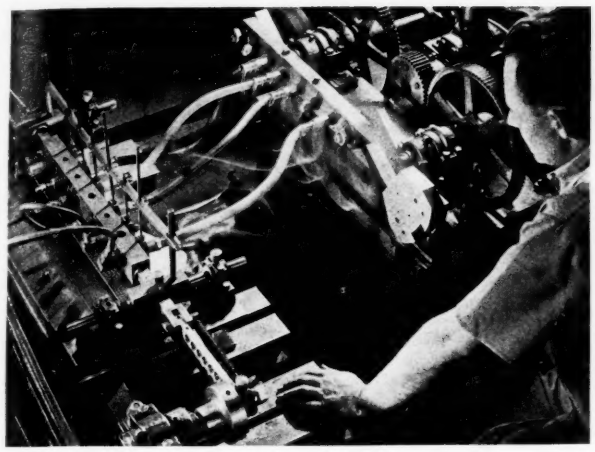
Chemical and Physical Properties

Chemically, Resistoflex PVA material can best be described as a solid colloidal solution, the ingredients of which have a very high degree of polymerization, a very high molecular weight, and a low specific gravity. When reduced to the most elementary terms, the raw materials of which Resistoflex PVA is made are found to be those well-known ingredients, coal, limestone, air, and water. The intermediate stages involve other well-known materials such as acetylene, acetic acid, vinyl acetate, and its polymerization product polyvinyl acetate. All of these materials are available in the United States, as are all the compounding ingredients and modifying agents used in the stock compounds.

Although early work with this material dates back to 1913, it did not become industrially important until about 10 years ago, and the first tubing made of Resistoflex PVA material was obtained by dipping glass rods repeatedly into a solution until a sufficiently heavy wall had been built up. It was not until seven or eight years ago



A vertical infra-red lacquer tower dries as many as a dozen coats of high-heat-resistant lacquer on the continuous lengths of hose. The 12 coats can be applied at speeds up to 4,000 feet per hour. Incidentally, the wipers which control the thickness of each coat are made of Resistoflex PVA.



Specially designed torture machine, developed by Resistoflex engineers, tests hose assemblies simultaneously under elevated temperatures, hydrostatic pressure, flexing, vibration, and torsion. This combination test duplicates years of service conditions in a few hours. As an example of the severity of the test, low-pressure automotive hose is subjected at the same time to oil at 250° F. at a pressure of 250 pounds per square inch, to flexing through an eight-inch circle at 250 r.p.m., to vibration at the rate of 1,800 cycles per minute of ¼-inch amplitude, and to torsional stresses of 3° at the same high rate.

TABLE 1. PHYSICAL PROPERTIES OF TWO TYPICAL RESISTOFLEX PVA COMPOUNDS

Property	Extruded	Molded
Tensile strength, lbs. per sq. in.	5236	2121
Elongation, % in 2 in. at break	213	445
Permanent Set,* %	78	80
Cold flow,† %	63.2	63.6
Dielectric strength,‡ volts per mil	0.10	10.70
Electrical conductivity, ohm-cm.	3.1×10^{7}	3.8×10^{7}
Thermal conductivity, cal. per sec. per sq. cm./1°C. per cm.	5×10^{-4}	18×10^{-4}

*This is the percentage elongation measured after stretching to three-fourths of ultimate elongation, holding for ten minutes, releasing, and allowing to recover for ten minutes.

†This is the percentage deformation of a 0.5-in. cube subjected to a pressure of 4,000 lbs. per sq. in. at 120°F. for 24 hours and allowed to recover for 24 hours.

‡Test made at 72°F. and 50% relative humidity.

TABLE 2. EFFECT OF VARIOUS SOLVENTS ON THE PHYSICAL PROPERTIES OF A TYPICAL EXTRUDED RESISTOFLEX PVA COMPOUND; SAMPLES IMMERSED IN SOLVENTS FOR 240 HOURS AT ROOM TEMPERATURE

Test	Specific Gravity at 72° F.	Shrinkage or Expansion in Six In., %	Tensile Strength Lbs./Sq. In.	Elongation in Two-In., %	Hardness (Durometer)
Original material before immersion	1.259	....	5,236	213	85
66% gasoline by volume, 24% ethanol, 10% benzene	1.195	—1.0	5,057	180	86
Gasoline (leaded)	1.250	—0.30	5,255	220	85
Kerosene	1.255	+0.30	5,247	220	84
Benzene (benzol)	1.251	+0.30	5,290	225	84
Xylol	1.260	+0.20	5,351	220	84
Acetylene gas	1.256	+0.10	5,340	220	85
Methylene dichloride	1.261	—0.40	5,110	225	84
Trichlorethylene	1.253	+0.10	5,140	225	86
Carbon tetrachloride	1.259	0.00	5,084	145	84
Monochlorbenzol	1.258	+0.10	5,026	190	84
Methanol (anhydrous)	1.203	—6.50	5,980	195	86
Ethanol (anhydrous)	1.181	—4.30	5,779	190	87
Ethylene glycol	1.186	+4.70	4,335	185	77
Acetone	1.246	—1.20	5,203	175	87
Petrohol	1.224	—1.30	5,971	165	89
Furfurol	1.250	—2.00	5,890	175	88
Methyl acetate	1.269	—0.70	5,403	185	85
Ethyl Acetoacetate	1.258	—0.50	5,491	205	85
Diethyl ether	1.260	—0.30	4,980	230	86
Dioxane	1.271	—1.30	5,272	195	85
"Freon" gas	1.270	—0.50	5,636	205	86
Butane gas	1.268	+0.30	5,352	200	86
Propane gas	1.267	+0.20	5,529	200	87
Sulphur dioxide	1.269	+0.50	5,497	215	86
Aniline	1.256	—0.70	5,557	185	86
Formamide	1.201	—4.00	3,845	195	77
Oxygen bomb accelerated aging test 300 lbs. oxygen pressure at 160° F. for 240 hours	1.259	+0.10	4,990	220	86

that the previously mentioned extrusion process was first developed. About five years ago Resistoflex Corp. purchased the United States and Canadian patents and organized for large-scale fabrication.

The characteristics, both physical and chemical, which are responsible for the unusually excellent performance of Resistoflex PVA products are *indicated* by the condensed laboratory reports shown in Tables 1 to 4 respectively. The word *indicated* is used deliberately because it has been found that laboratory tests, as such, have been relatively inconclusive in evaluating the superior operating qualities and the increased service life of Resistoflex products. These have been primarily established by tests under actual operating conditions.

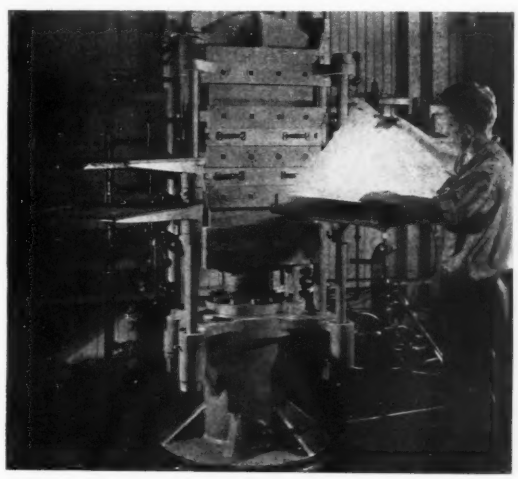
It should also be noted that some of the commonly used indices or tests of rubber or synthetic rubber are meaningless when applied to Resistoflex PVA compounds. One of these, for example is *elongation*, which, though useful as a gage of rubber quality, has no bearing on the quality of these compounds. The Geer oven test cannot be used to determine their aging characteristics because, as is demonstrated by the prolonged oxygen bomb tests included in Table 1, they are not subject to oxidation; whereas being hygroscopic, they are completely desiccated and devitalized by the warm, dry air of the oven.

TABLE 3. PERMEABILITY TO LIQUIDS OF A TYPICAL EXTRUDED RESISTOFLEX PVA COMPOUND AT 77° F.

	Gasoline	Benzene
Pressure above atmosphere	Nil	Nil
Permeability, liters per sq. m. per 24 hours per 0.01-cm. thickness	.058	.057
Specific permeability, c.c. per sq. centimeter per centimeter thickness per minute	$.04\times10^{-6}$	$.04\times10^{-6}$

TABLE 4. PERMEABILITY TO GASES OF A TYPICAL EXTRUDED RESISTOFLEX PVA COMPOUND AT 77° F.

	Hydrogen	Oxygen	Acetylene	Nitrogen
Pressure, lbs. per sq. in.	26.48	27.25	25.01	29.21
Pressure above atmospheric, lbs. per sq. in.	11.77	12.54	10.3	14.50
Permeability, liters per sq. m. per 24 hours per 0.01-cm. in thickness	1.41	.51	2.34	0.114
Specific permeability—c.c. per sq. centimeter per centimeter thickness per minute	$.98\times10^{-6}$	$.35\times10^{-6}$	1.63×10^{-6}	$.08\times10^{-6}$
Permeability, liters per sq. m. per 24 hours per 0.01-cm. thickness extrapolated to 1 atmosphere	.78	.27	1.38	.06



Translucent sheets of Resistoflex PVA are molded in hydraulic platen presses. This is the stock from which Resistoflex washers and gaskets are stamped, as well as blanks for subsequent remolding in flash or semi-positive type of molds.

Applications

In actual service the unusual characteristics of Resistoflex products have been amply borne out, and current applications have made use of one or more of them. For example, the chemical inertness made Resistoflex hose ideal for automobile, bus, and truck gasoline lines. The fact that it is unaffected by the aromatic hydrocarbons such as benzol, toluol, and xylol has brought it to the fore for automotive equipment being sold in the export market, for in many parts of the world gasoline is very high in benzol content, and benzol and the other aromatics are definitely destructive to certain synthetic rubbers. This same characteristic makes Resistoflex highly useful on motorized war equipment which, of course, may be sent anywhere in the world.

Resistoflex hose is also unaffected by another fuel which is growing in importance; namely, Diesel oil. The inner surface of the hose does not tend to gum or slough off and thus prevents clogging the injector pumps or nozzles. The inner diameter of the hose remains constant, assuring a full and complete fuel supply.

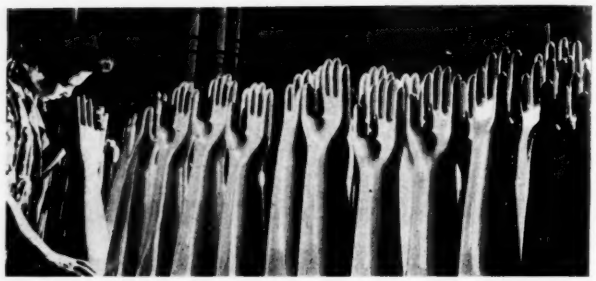
These same non-swelling characteristics, combined with ability to withstand a wide range of operating temperatures, prompted the use of Resistoflex hose for automotive, Diesel, and aircraft oil lines and for lubrication hose of all kinds. Its resistance to fatigue occasioned by vibrations or flexing also recommended it to many manufacturers of buses, trucks, and other heavy-duty equipment, such as road-building machinery, tractors, shovels, etc., where various constructions have been developed to meet specific operating conditions. During the last year Resistoflex hose has met many of the government hose specifications for vehicles of the Quartermaster Corps and tanks and other combat vehicles of the Ordnance Department.

Because of the high tensile strength and the low specific gravity of Resistoflex PVA material, Resistoflex hose constructions are generally lighter and less bulky than equivalent grades of synthetic rubber hose. This toughness and compactness, combined with ability to resist collapsing due to high vacuum, have resulted in the approval of Resistoflex hose and hose assemblies for aircraft fuel, oil, vacuum, instrument, and hydraulic lines by the Civil Aeronautics Board. They also comply with the Army and Navy aircraft specifications for low- and medium-pressure work.

Paint spray hose has been developed which is not only unaffected by the paint and lacquer thinners, but which, being non-porous and particularly dense, resists the internal adhesion of the pigments used. It withstands repeated flushings even with solvents at temperatures approaching their boiling point. Oxyacetylene welding and cutting hose, hydraulic hose for machine tools, and chemical hose for the handling of fire extinguisher fluids, dry-cleaning and degreasing solvents, and for other organic oils and liquids have demonstrated a service life of from two to 25 times that of previously used products.

A further word about the hydraulic hose may be of interest. This hose has been engineered to stand repeated pulsating pressures. More important, the non-swelling and non-sloughing interior eliminates clogging of valves and any reduction in the volume of hydraulic fluids pumped through the hose.

The low permeability of Resistoflex PVA material to liquids and gases, illustrated in Tables 3 and 4, has resulted in the development of refrigerant hose that is truly gas-tight. It is lighter in weight than the flexible metal hose heretofore used and is capable of withstanding much more severe vibration, flexing, and torsional stresses. By the same token hose constructions used for transmission



Light, transparent, and solvent-proof Resistoflex industrial gloves are shown before stripping from forms.

of solvents and gases, particularly those constructions which are normally kept full, show a much smaller solvent or pressure loss than is normally obtained. By curtailing this loss through diffusion of solvents, many of which are very costly, Resistoflex hose affords the user a real economy. The annual savings, in some cases, far exceed the total cost of the hose.

For handling solvent-laden objects, as in the dry-cleaning industry or in degreasing operations, Resistoflex gloves have greatly reduced such occupational diseases as folliculitis and dermatitis. They are being used at present as a protection against insoluble sulphur-base cutting oils, petroleum or naphtha solvents, carbon tetrachloride, trichlorethylene, perchlorethylene, benzol, ether, chloroform, ethylene dichloride, Varsol, etc. Containing no sulphur, Resistoflex gloves cause no tarnishing of metal surfaces and are therefore being used for the handling of finely polished metal parts.

The line of Resistoflex specialties also includes cast, laminated, dipped, and molded products of various kinds. For example, industrial aprons, extremely light in weight, are made of an unreenforced sheet of high abrasion and tear resistance. Another type, designed for rougher use, consists of a tightly woven fabric heavily coated with Resistoflex PVA material.

In the field of mechanical molded goods, Resistoflex sheets, either clear, with fabric inserts, or backed with fabric, have been used as diaphragms, gaskets, washers, etc., and have been molded into various articles. Other molded products include wipers, vibration mountings for machinery, and particularly mountings subject to constant exposure to oils.

Another recent development is printing plates. These have excellent ink receptivity and, being almost transparent, allow the printer an ease of register not obtainable with the usual opaque rubber plates.

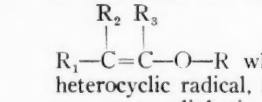
Unlike synthetic rubber, Resistoflex molded products normally tended to shrink slightly upon exposure to solvents. In many applications this has been a big advantage in preventing binding or seizing. But Resistoflex PVA compounds have recently been developed in which this tendency to shrink has been eliminated, and, in fact, it is now possible to supply compounds which will swell in desired amounts to meet specific needs.

UNIVERSITY OF CALIFORNIA SCIENTISTS TOLD THE GOVernment last month that there are 500,000,000 pounds of natural rubber (220,000 long tons) on the deserts of six Western States, ready for immediate harvest. The rubber exists in the rabbit brush, and can be harvested and handled much the same as guayule, the report stated. Production costs are estimated at 45¢ per pound.

German Patents Relating to Vinyl Polymers—III

Law Voge[1]

A PATENT (45)[2] for a process for polymerization products prepared from vinyl ethers states that in vinyl ethers of the general formula



where R is an aliphatic, aromatic, or heterocyclic radical, and R_1, R_2, and R_3 represent hydrogen or an aliphatic radical, polymerization products can be most advantageously prepared if the vinyl ether is treated with an acid condensation agent such as stannic chloride, stannous chloride, aluminum chloride, ferrous chloride, boron fluoride, etc. Very small amounts, such as 0.5%, cause polymerization. The agent should be added gradually, usually with cooling. The intensity of the reaction may be lessened by the use of diluents such as benzene, toluene, and xylene.

A patent (46) was applied for first in the United States and later in Germany on a process for the preparation of synthetic resin by agitating a fraction of cracked petroleum distillate with metallic halide activating agent. The final product, as described in United States patent No. 1,836,629, is highly polymerized with a molecular weight in the range of from 1,300 to 1,500; hard and pulverizable, the resin is substantially soluble in benzol and gasoline and substantially insoluble in alcohol and acetone; its color varies from a brown shading to a dark amber.

As initial material for the preparation of polymeric acids such as polyacrylic acid, etc., up to the present the monomeric acids concerned have been used. Similarly the derivatives of the polymeric acids have been prepared by polymerizing the corresponding monomeric compounds. It has now been found in patent (47) that valuable transformation products of polymeric nitriles of organic acids containing at least one carbon double linkage may be obtained if the polymeric nitriles are saponified (as are monomeric nitriles) and the resulting polymeric acids are esterified.

Patent (48) states that the preparation of highly viscous products from the reaction of aldehydes with polyvinyl alcohols is known. It has now been found that valuable high molecular weight substances are produced if polyvinyl alcohols are treated with aldehydes in association with substances which condense with aldehydes to form high molecular weight substances of high elasticity and durability.

If polymerized products of styrol are heated, they first become rubbery and elastic, according to patent (49). Further increase in temperature causes depolymerization; the substances decompose and styrol is reformed before melting occurs. Therefore, polystyrol can not be cast into forms. Meltable synthetic materials of styrol can be obtained if it is polymerized in the presence of cyclohexanol or its homologs. Homologs of styrol may be similarly worked. The polymerization of styrol in the presence of solvents such as ethyl benzene, toluene, or xylene, is already known. These solvents tend to dissolve polystyrol both hot and cold and are thereby differentiated from cyclohexanol which can dissolve polystyrol only when hot.

In patent (50) polyvinyl nitrate is prepared from polyvinyl alcohol after previous dissolving in concentrated sulphuric acid by combining it with a nitrating acid. The separation of the nitrate is performed by increasing the temperature.

Patent (51), which forms a supplement to patent (37),[3] states that polyvinyl alcohol can readily be prepared from polyvinyl mixed esters, one of which is the halogenated organic ester, while the other is non-halogenated.

According to patent (52), polyvinyl esters are usually insoluble in commercial alcohol, the cheapest of the solvents, but it is now found that soluble forms may be obtained by dissolving the polyvinyl acetate, first in well-known solvents such as ethyl acetate, acetone, etc., then by substituting alcohol for the solvent at boiling temperature and forming a paste by chilling. Alcoholic solutions may be prepared readily from this paste.

The next patent (53) concerned a process for the preparation of derivatives of polyvinyl alcohol. In this process the polyvinyl alcohols are transformed by alkylene oxides in the presence or absence of accelerating agents. The oxides cited are: ethylene oxide, propylene oxide, epichlorhydrine, and glycide.

A process for the preparation of polymeric acrylic chloride was covered in patent (54). To polymerize acrylic chloride by the action of light is well known. It has now been discovered that this action can be very greatly accelerated if there are added to the reaction material small amounts of organic basic compounds which do not react with acrylic chloride in the cold. Triethylene tetramine is mentioned as one such compound. Moisture must be excluded during the reaction.

A process (55) covers the preparation of soluble and likewise high molecular weight polymerization products of acrylic acid compounds. The polymerization of acrylic acid compounds results in either very highly polymerized insoluble products or, if the polymerization is prematurely interrupted or carried out in solution, soluble products having only a low degree of polymerization; their solutions have low viscosity. In the use of these polymerization products, for instance for the preparation of films, fibers, etc., the complete solubility of the products is an unavoidable assumption. It is also highly important that the products be of high molecular weight as, for instance, cellulose and its derivatives or rubber; otherwise the mechanical properties, such as strength, elasticity, softening point, etc., are insufficient. It has now been discovered that soluble and at the same time high molecular weight polymerization products of acrylic acid compounds can be prepared in industrial quantities if the polymerization is carried out in the presence of not more than a few per cent. of the material serving as solvent, swelling or plasticizing agent for the polymerization product.

The next invention (56) is on the preparation of polymerization products from styrol. It concerns the acceleration of the emulsion polymerization of these products —styrol and its homologs and mixtures—through the presence of oxygen-yielding compounds such as oleic

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[1] Research chemist and engineer, Washington, D. C.
[2] For details on patents see end of this article.
[3] See INDIA RUBBER WORLD, Nov. 1, 1941, p. 158.

acid with hydrogen peroxide in an ammoniacal solution or of ammonium oleate, hydrogen peroxide, and benzoyl peroxide.

The next invention (57) concerns polymerizates of acrylic acid derivatives or their homologs. When the cited substances are alone or in mixture or in combination with other substances, such as non-polymerizable vegetable or animal oils or fats, their derivatives or transformation products are emulsified in water and polymerized in known manner; the polymerizable components considerably exceed the non-polymerizable components in amount. Seventeen examples are presented in this patent.

A process (58) for the preparation of plastic condensation products from dihalogenated paraffin hydrocarbons is equivalent to United States patent No. 1,950,744. Compounds such as ethylene chloride in an aqueous polysulphide solution are polymerized in the presence of freshly precipitated magnesium hydroxide with a maintenance of the pH value between 7 and 12, preferably between 8 and 10, with a polysulphide of the formula XS_n in which n is greater than 3.75, while X signifies the metal radical. The product is isolated by coagulation.

The next patent (59) treats of a process for improving the aging properties of plastic substances formed from paraffin dihalides and polysulphides. This invention is equivalent to British patent No. 350,456, but the U. S. patent applied for May 6, 1929, has apparently not been granted. The German patent claims merely the treatment of the polymerization products from the paraffin dihalides and the polysulphides, by heating about one hour at 135 to 145° C.

Then follows the invention of a process (60) for the preparation of substances containing polyvinyl esters. Organic polyvinyl esters have the property of softening even at relatively low temperatures. This property becomes a defect when these polymerized esters are used in the lacquer and pressed articles industries. Pigments, when added, overcome this defect somewhat, but impair the elasticity and mechanical properties. It has now been found that an especially favorable action in stiffening the polyvinyl ester skeleton without injury to the elastic and mechanical properties is attained if an appropriate amount of cellulose is incorporated.

Plastics from polyvinyl esters form the objects of the next invention (61). It has been found that high molecular weight nitrogenous fibrous material stiffens surprisingly the polyvinyl ester products. Wool or silk is proposed for use in this connection.

The substitution of acetal radicals for OH groups in partly or totally saponified polyvinyl esters is discussed in the following patent (62). The starting material for this process is polymers of organic vinyl esters obtained by polymerization in the presence of aliphatic aldehydes. These polymers are dissolved in a suitable organic solvent, e.g., ethyl alcohol, and treated with an aldehyde in the presence of a mineral acid. The two reactions, i.e., polymerization and acetalization, can be conducted as a continuous process. The properties of the final products depend on the kind and quantity of aldehyde used in the two reactions. Thus by the choice of the aldehydes and their respective amounts for each of the two steps the properties of the final product are regulated as desired.

A modification of the preceding process is the subject of patent (63). Here the starting compound is but a partly saponified polyvinyl ester. Another difference lies in the fact that polymerization is conducted in the absence of aldehyde. Starting with such polymers the acetalization is as before, i.e., with a saturated or unsaturated aliphatic aldehyde and in the presence of a mineral acid. The final product contains both acidyl and acetal groups. Because of that the product is harder and tougher. Here again the properties of the final product can be controlled by regulating the degree of saponification and the nature and quantity of the aldehyde.

In the next patent (64) the inventors state that means have now been found to prepare polyvinyl esters soluble both in water and in organic solvents, if, for instance, only a portion of the polyvinyl alcohol is esterified. The esterification of polyvinyl alcohol is carried out using an amount of the esterification agent insufficient for the esterification of the hydroxyl groups contained in the polyvinyl alcohol and prolonged only long enough for sufficient acid radical to have entered the polyvinyl alcohol molecule so that its solubility and emulsifiability in water can be maintained while the solubility or emulsifiability in organic solvents is just beginning. Polyvinyl alcohol, for instance, is caused to react with acetyl chloride and a benzene solution of pyridine combined with it.

The following patent (65) covers an improvement of the process for the polymerization of butadiene or its homologs with compounds of the general formula:

R signifies hydrogen or alkyl. This is a supplement to German patent 654,989 (57). In the example, acrylic nitrile and butadiene are emulsified with an aqueous solution of a hydrochloric acid salt of diethylaminoethyloleylamide and trichloracetic acid. The products are said to vulcanize well.

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(Owing to Mr. Voge's increased duties in his position with the United States Navy Department, he will no longer be able to continue this series. But arrangements are being made with another patent specialist to complete the work. THE EDITOR.)

Naftolen as a Plasticizer and Extender for Rubber in Carbon Black Compounds

Fritz Rostler and Vilma Mehner[1]

IN a previous issue[2] and in more detail in a commercial publication[3] a general description was given by the authors of the product Naftolen and its properties for rubber compounding. The present article is the first to be devoted to specific problems.

All compounds in the investigation covered in this article have as a basis natural rubber. Compounds containing reclaim and synthetic rubber as the bulk of rubber hydrocarbons will be discussed in papers to follow. The investigation described in this article is based on a compound of the tire-tread type. Although this type of compound has been selected as the basic formula, general rules for compounding have been derived applicable to all compounds where abrasion resistance is the most important factor, i.e., rubber soles, heels, conveyer belts, cable jackets, etc.

Definition of Terms

One essential ingredient in a carbon black compound is the dispersing agent, which may be of the nature of a plasticizer or of a rubber extender.

It is difficult in most cases to distinguish scientifically a plasticizer from a rubber extender. In fact, many arguments arise from the question of whether a rubber compounding material is a plasticizer, a dispersing agent, a rubber extender, or a rubber substitute. As a rule, most arguments can be avoided by defining from the beginning what is to be meant by certain terms. An attempt will be made to avoid such confusion by defining what is meant in this paper by these terms:

Dispersing agent, a compounding material which brings about good distribution of the carbon black throughout the mix, recognizable on superficial observation by glossy cut surface and deep blackness of the cured stock;

Plasticizer, a compounding material which, when used in relatively small percentage, effects an appreciable softening of the rubber mix both before and after vulcanization;

Rubber extender, a compounding material which, when used in relatively large amounts, results in a substantial increase in volume of the final product without lowering the physical properties below a commercially practicable level, and which alters the physical properties of the cured stock in direct proportion to the amount incorporated;

A rubber substitute, a material which can replace all the rubber in a rubber compound.

The classification of a substance according to these definitions is further dependent on the purpose for which the compound is designed. A material may be a satisfactory extender for one compound and only a plasticizer for another. (For example: factice can be a rubber substitute in art gum erasers, but functions as a plasticizer in inner tubes.)

[1] Wilmington Chemical Corp., Wilmington, Del.
[2] INDIA RUBBER WORLD, Aug. 1, 1941, pp. 47-50.
[3] "Naftolen for Rubber", a booklet distributed by Wilmington Chemical Corp.
[4] Standard grade manufactured by Wilmington Chemical Corp.
[5] De France and Krantz investigated the influence of pine tar, mineral rubber, and stearic acid in amounts up to 16 parts on 100 parts of rubber. *Ind. Eng. Chem.*, 23, 824 (1931). See also, Talalay in E. A. Hauser's "Handbuch der Gesamten Kautschuktechnologie", Vol. 1, p. 257, Union Deutsche Verlagsgesellschaft, Berlin, 1934.

Basis of Compounding

The same basic formula was used throughout the investigation, and care was taken that only one compounding factor was changed at a time. From previous experience and preliminary tests the approximate composition of a Naftolen-containing tire tread compound was selected as a starting formula. This formula contained on 100 parts of rubber, 8 parts of Naftolen R100[4], 3.2 parts of sulphur, 1.5 parts of stearic acid, 5 parts of zinc oxide, 1.5 parts of antioxidant, 1 part of accelerator, and 55 parts of carbon black. Preliminary tests had indicated that this amount of sulphur is required for this compound. The same holds for the amount of stearic acid and accelerator used. Somewhat more carbon black was used than is customary in tire-tread compounds for the following two reasons: Experience has shown that in compounds containing Naftolen a high amount of carbon black is advantageous. Secondly, deficiency of filler would be disturbing in a series where an increasing amount of plasticizers is intended to be tested. An antioxidant was used in this formula because its use is customary. However, whether an antioxidant is necessary has not yet been determined. The amount of zinc oxide used is standard, but the optimum quantity has not been ascertained. The active carbon black used was Standard Micronex; the antioxidant, Agerite Powder; the zinc oxide, Horse Head XX Red 4.

Starting with the basic formula four parallel series of mixtures were set up with increasing amounts of Naftolen, pine tar, mineral rubber, and mineral oil. The amounts employed were from eight to 70 parts of plasticizer on 100 parts of rubber.[5]

After the influence of increasing amounts of these four varients in the basic formula had been determined, the influence of varying the amount of carbon black was studied in two series of mixtures containing 30 and 50 parts of Naftolen and 100 crude rubber. In one case the optimum amount of sulphur was determined.

Varying the Plasticizer

In Table 1 are given the formulas and physical data of five mixtures with increasing amounts of Naftolen R100 from eight parts to 70 parts on 100 parts of rubber (Series CB/N). All other ingredients were kept constant except the sulphur. The amount of sulphur was varied in accordance with the increasing amount of vulcanizable hydrocarbons in the mixture (rubber plus Naftolen R100) so that a deficiency of sulphur would not distort the results.

In Table 2 are given the formulas and test data of the parallel series of mixtures containing pine tar in place of Naftolen R100 (Series CB/PT). Otherwise the compounding is identical with Series CB/N. Tables 3 and 4 contain the formulas and data for comparative mixtures with mineral rubber (Series CB/MR) and mineral oil (Series CB/MO), respectively.

TABLE 1. SERIES CB/N

Compound No.	1	2	3	4	5
Smoked sheets	100.	100.	100.	100.	100.
Stearic acid	1.5	1.5	1.5	1.5	1.5
Sulphur	3.2	3.5	4.	4.5	5.
Naftolen R100	8.	15.	30.	50.	70.
Micronex	55.	55.	55.	55.	55.
ZnO	5.	5.	5.	5.	5.
Agerite Powder	1.5	1.5	1.5	1.5	1.5
Captax	1.	1.	1.	1.	1.
Optimum cure @ 35# (Min.)...	25	25	25	35	35
Hardness (Shore)	65	61	56	52	44
Stress strain @ 300%	1250	1020	760	600	400
Stress strain @ 500%	2720	2360	1860	1480	970
Tensile @ Break	4300	4120	3720	3220	2500
Elongation @ Break	700	710	730	760	760
Abrasion (Du Pont Abrader Norton Wheel 461)	163	202	235	338	Sample very soft

*Cure used for abrasion tests 10 minutes higher.

TABLE 2. SERIES CB/PT

Compound No.	1a	2a	3a	4a	5a
Smoked sheets	100.	100.	100.	100.	100.
Stearic acid	1.5	1.5	1.5	1.5	1.5
Sulphur	3.2	3.5	4.	4.5	5.
Pine tar	8.	15.	30.	50.	70.
Micronex	55.	55.	55.	55.	55.
ZnO	5.	5.	5.	5.	5.
Agerite Powder	1.5	1.5	1.5	1.5	1.5
Captax	1.	1.	1.	1.	1.
Optimum cure @ 35# (Min.)...	60	60	60	45	Too soft to be mixed
Hardness (Shore)	69	67	67	50	
Stress strain @ 300%	1360	1150	720	400	
Stress strain @ 500%	2890	2450	1820	950	
Tensile @ Break	4160	3900	3400	1500	
Elongation @ Break	650	680	700	620	
Abrasion (Du Pont Abrader Norton Wheel 461)	186	243	436	803	

*Cure used for abrasion tests 10 minutes higher.

TABLE 3. SERIES CB/MR

Compound No.	1b	3b	4b
Smoked sheets	100.	100.	100.
Stearic acid	1.5	1.5	1.5
Sulphur	3.2	4.	4.5
Mineral rubber	8.	30.	50.
Micronex	55.	55.	55.
ZnO	5.	5.	5.
Agerite Powder	1.5	1.5	1.5
Captax	1.	1.	1.
Optimum cure @ 35# (Min.)...	45	45	45
Hardness (Shore)	63	59	60
Stress strain @ 300%	1040	650	450
Stress strain @ 500%	2410	1540	1190
Tensile @ Break	3810	3140	2760
Elongation @ Break	655	730	760
Abrasion (Du Pont Abrader Norton Wheel 461)	303	515	693

*Cure used for abrasion tests 10 minutes higher.

TABLE 4. SERIES CB/MO

Compound No.	1c	3c	4c
Smoked sheets	100.	100.	100.
Stearic acid	1.5	1.5	1.5
Sulphur	3.2	4.	4.5
Mineral oil*	8.	30.	50.
Micronex	55.	55.	55.
ZnO	5.	5.	5.
Agerite Powder	1.5	1.5	1.5
Captax	1.	1.	1.
Optimum cure @ 35# (Min.)...	45	45	45
Hardness (Shore)	62	51	42
Stress strain @ 300%	1240	700	440
Stress strain @ 500%	2740	1670	1060
Tensile @ Break	3720	2340	1400
Elongation @ Break	607	607	587
Abrasion (Du Pont Abrader Norton Wheel 461)	258	518	1060

*Squibb Mineral Oil, Heavy Californian, Liquid Petrolatum.
*Cure used for abrasion tests 10 minutes higher.

The pine tar was standard rubber makers' grade, and the mineral rubber, granulated M. R., 275° F. The mineral oil[6] was of sufficiently high viscosity to make possible the incorporation of the amounts used in the tests and had an average molecular weight in the same range as Naftolen R100. The chemical difference lies in that the Naftolen is of unsaturated hydrocarbon composition; while the mineral oil is entirely of saturated hydrocarbon composition. In previous tests it was found that a mineral oil of lower viscosity could not be incorporated. Even in the mixtures given in Table 4 bleeding out of the oil is noticeable. Because of this instability they could hardly be used for practical purposes. However it was possible to produce cured stocks, which would be tested.

Even superficial observation of the compounds before and after curing showed a difference in the behavior of the four materials investigated. The Naftolen R100 mixtures were uniform and homogeneous mixtures with good surface tack in uncured condition, and in the cured stage had the appearance of a normal rubber compound. The same held for the pine tar mixtures up to 30 parts. The mixture with 50 parts of pine tar showed a poor dispersion of carbon black. It was impossible to incorporate 70 parts of pine tar because the stock was much too soft, and the pine tar ran through the mill. The mixtures with mineral rubber lacked the surface tack of the Naftolen-containing mixture, and 50 parts of mineral rubber gave a very dry stock with poor carbon black dispersion, which is in accord with general knowledge about mineral rubber.[7] The mixtures with mineral oil had a poor surface tack, and the behavior of the mineral oil was typical of a lubricant; the incorporation of high amounts was very difficult.

A comparison of the optimum curing time showed that the Naftolen mixtures cured considerably faster than the other ones.

The combined physical data of these four series of mixtures (Series CB/N, Series CB/PT, Series CB/MR, and Series CB/MO) are illustrated graphically in Figure 1 (tensile at break) and Figure 2 (abrasion). Keeping in mind that the four selected compounding ingredients can be used for the same purpose, as dispersing agents for the carbon black, certain general conclusions can be drawn from the trend of the curves.

Figure 1 shows that in the range examined the tensile strength of the basic formula under examination decreased with increasing amounts of all four dispersing agents. The same holds for Figure 2 giving the graph for abrasion resistance, the other quality which is of most importance for carbon black compounds.

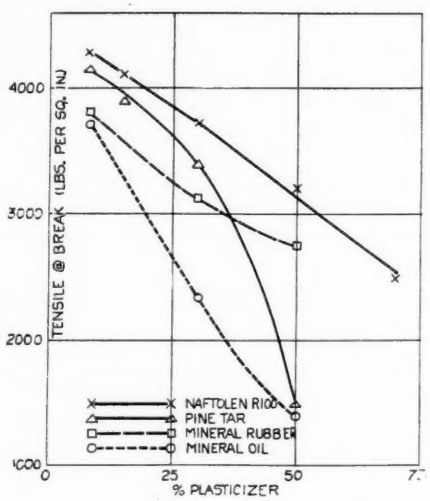
Both tensile strength and abrasion resistance are higher with Naftolen R100 in all mixtures tested than with any of the other plasticizers. Furthermore the rate of decrease in these properties with increasing amounts of plasticizer is appreciably smaller in the case of Naftolen R100 than in the case of the other plasticizers. For instance, the tensile strength of 2500 lbs./sq. in. of the compound containing 70 parts of Naftolen R100 and 55 Micronex is unusual for a dispersing agent. The decrease of the tensile strength and decrease of abrasion resistance (increase of abrasion index) in the mixture series containing Naftolen follow practically a straight line up to the highest percentage of Naftolen used, demonstrating that the decrease is directly proportional to the amount of Naftolen used.

Pine tar, an accepted plasticizer for rubber and an acknowledged dispersing agent for carbon black, most nearly approaches Naftolen R100 in the lower range, but with increasing amounts of pine tar the tensile strength and also the abrasion resistance of the compound drop off rapidly.

The curve for mineral rubber shows lower tensile than does pine tar up to 40 parts. Above 40 parts the difference in viscosity is to the advantage of mineral rubber, and the physical data are better than for pine tar. However in this higher range the actual figures for abrasion show that the quality of the compound is outside the range of practical usability where this property is important.

[6] Squibb Mineral Oil, Heavy Californian, Liquid Petrolatum.
[7] Davis-Blake, "Chemistry and Technology of Rubber", p. 758, Reinhold Publishing Corp., Monograph Series No. 74, 1937.

Fig. 1



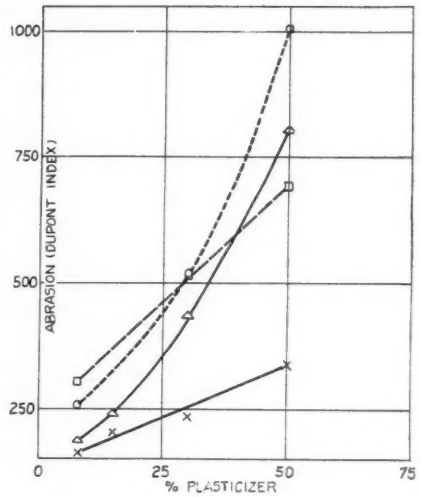


Fig. 2

TABLE 5. SERIES CB/30

Compound No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Smoked sheets	100	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
Stearic acid	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Sulphur	4.	4.	4.	4.	4.	4.	4.	4.	4.	4.	4.	4.	4.	4.
Naftolen R100	30.	30.	30.	30.	30.	30.	30.	30.	30.	30.	30.	30.	30.	30.
Micronex	..	20.	40.	45.	50.	55.	60.	65.	70.	75.	80.	100.	150.	200.
ZnO	5.	5.	5.	5.	5.	5.	5.	5.	5.	5.	5.	5.	5.	5.
Agerite Powder	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Captax	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
Optimum Cure @ 352° (Min.)	25	25	25	25	25	25	25	25	35	35	35	35	35	35
Stress Strain @ 300%	220	330	540	570	680	740	760	850	1200	1100	1230	1770	..	..
Stress Strain @ 500%	590	960	1390	1520	1630	1740	1820	2000	2400	2350	2450	..	..	..
Hardness (Shore)	35	41	50	52	54	57	60	61	65	66	67	77	90	97
Tensile @ Break	3040	3150	3750	3740	3790	3640	3540	3500	3500	3300	3120	2660	2330	1580
Elongation @ Break	760	750	770	767	767	750	740	690	660	640	617	470	250	83
Abrasion (Du Pont Abrader Norton Wheel 461)*	3102	562	291	277	254	231	216	199	231	197	178	133	49	68

*Cure used for abrasion tests 10 minutes higher.

The decrease in tensile strength of the mixtures with mineral oil is also represented by a straight line, but a very steep one. The abrasion falls off most rapidly and not in a straight line.

From the results of these series of mixtures it may be concluded that pine tar is purely a plasticizer. Mineral rubber cannot be classified as an extender in a compound where abrasion is important owing to the rapid falling off of the abrasion resistance with increasing amounts.[8] The behavior of mineral oil is, as mentioned before, typical for a lubricant and a diluent of inert character. Tensile and abrasion drop off rapidly. The reenforcing properties of carbon black are disturbed.

Naftolen R100 is, in accordance with these results, a true extender for rubber in carbon black compounds: the curves for both tensile and abrasion are practically straight lines, and the decrease of the physical qualities remain in the range of practical application even with large amounts.

Varying the Amount of Carbon Black

Compound 3 of Series CB/N (Table 1), which was developed from the basic formula as outlined above, was made the starting mixture for Series CB/30 (Table 5). (It appears in this series as Compound 6). In Series CB/30, which is composed of 14 mixtures, all components are kept constant except the carbon black, which was varied from zero to 200 parts on 100 parts of rubber (130 parts of hydrocarbon) with a variation of only five parts between the mixtures in the most interesting range (Compounds 3 to 11). The formulas and physical data of these mixtures are given in Table 5 and in Figure 3 (tensile at break) and Figure 4 (abrasion).

The appearance of the cured and uncured stocks was normal. No difficulties were encountered in mixing the stocks, and all mixes were homogeneous, had good surface tack, and the carbon black dispersions appeared good. Compound 1 had the appearance of a pure gum stock; Compounds 4 to 9, the appearance of a tire tread; and Compounds 10 to 14, of a stock suitable for soling and other high-loaded compounds.

The results obtained from this series are interesting not only for a compounder of a Naftolen-containing mix, but may be of general significance for compounds of which the characteristic component is active carbon black.

It is known that if a pure gum stock is progressively loaded with an active filler, tensile and abrasion approach an optimum and from this optimum fall off with increasing loading. This course of abrasion curve is illustrated in Figure 5 taken from a previous study on loading a Naftolen-containing pure gum stock compounded with inactive fillers, principally Dixie clay[9].

If the amount of Micronex is gradually increased, the optimum for tensile is reached for 50 parts of Micronex, and the curve is similar in trend to curves for inactive fillers.

It is in respect to abrasion that a significant difference between active and inactive fillers shows up. On the graph for abrasion (Figure 4) the curve for the abrasion between the points representing a load from 0 to 70 parts of carbon black takes the expected course. The optimum abrasion resistance is at 65 parts. The compound with 70 parts has lower abrasion resistance. However from this

[8] It might be classified as a rubber extender in mixtures containing inactive fillers.
[9] Reported on pp. 46 to 53 of the booklet "Naftolen for Rubber."

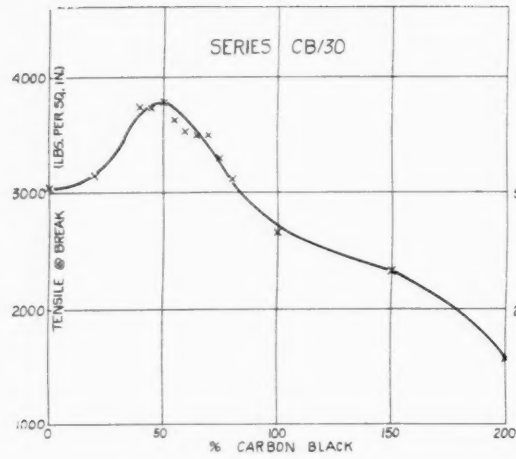


Fig. 3

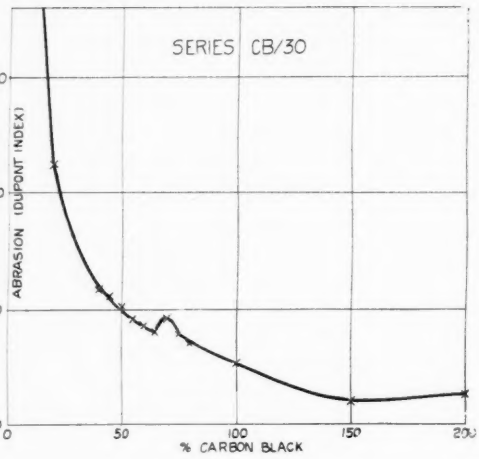


Fig. 4

TABLE 6. SERIES CB/50

Compound No.	1	2	3	4	5	6	7
Smoked sheets	100.	100.	100.	100.	100.	100.	100.
Stearic acid	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Sulphur	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Naftolen R100	50.	50.	50.	50.	50.	50.	50.
Micronex	...	20.	50.	55.	60.	71.5	150.
ZnO	5.	5.	5.	5.	5.	5.	5.
Agerite Powder	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Captax	1.	1.	1.	1.	1.	1.	1.
Optimum Cure at 35#* (Min.)	15	20	25	35	35	35	35
Hardness (Shore)	30	36	47	50	52	55	86
Stress Strain @ 300%	130	280	470	530	450	640	1710
Stress Strain @ 500%	310	610	1150	1310	1180	1520	..
Tensile @ Break	2360	2670	3210	3200	2940	2900	1980
Elongation @ Break	817	790	790	800	760	700	320
Abrasion (Du Pont Abrader Norton Wheel 461)	...	854	299	333	402	250	81

*Cure used for abrasion tests 10 minutes higher.

TABLE 7. SERIES CB/30-S

Compound No.	1	2	3	4	5	6	7	8
Smoked sheets	100.	100.	100.	100.	100.	100.	100.	100.
Stearic acid	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Sulphur	2.5	3.	3.2	3.5	3.8	4.	4.2	4.5
Naftolen R100	30.	30.	30.	30.	30.	30.	30.	30.
Micronex	65.	65.	65.	65.	65.	65.	65.	65.
Zn()	5.	5.	5.	5.	5.	5.	5.	5.
Agerite Powder	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Captax	1.	1.	1.	1.	1.	1.	1.	1.
Optimum Cure @ 35#* (Min.)	45	45	35	45	35	35	35	35
Hardness (Shore)	60	61	61	62	62	64	62	62
Stress Strain @ 300%	870	1020	1000	1000	990	1050	1000	1020
Stress Strain @ 500%	1920	2140	2190	2130	2220	2250	2190	2190
Tensile @ Break	3360	3480	3560	3410	3650	3550	3480	3440
Elongation @ Break	717	687	687	677	690	670	680	670
Abrasion (Du Pont Abrader Norton Wheel 461)	437	316	282	248	221	228	237	232

*Cure used for abrasion tests 10 minutes higher.

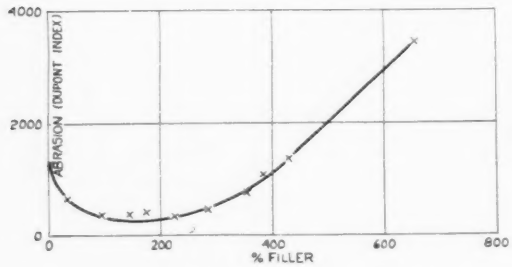


Fig. 5

point the curve takes a remarkable course. An increase in the load of carbon black beyond 70 parts does not bring about a continuation of the decrease in abrasion resistance as in the case of inactive fillers. Up to 150 parts of carbon black there is an improvement in abrasion resistance. The abrasion resistance starts to fall off only when the mixture becomes obviously overloaded, and the amount of hydrocarbons becomes insufficient to bind the carbon black.

The explanation for the second optimum for abrasion, represented by a lower abrasion index than the first optimum, might be found in the figures for hardness and elongation. In the higher range the hardness starts to play an important role. The difference in the trend in the abrasion curves for active and inactive fillers establishes the fact that some importance should be attached to the second optimum. A compounder for soling or similar articles might be interested much more in the second optimum than in the first one. It would be a mistake to disregard the importance of this second optimum.

Another point of significance in this series of mixtures is that the optimum carbon black loading for tensile and for abrasion is not identical. The conclusion to be drawn from this series (Series CB/30), if a compound is to be selected for tire tread, is that the proper amount of carbon black is 65 parts as indicated by the curve for abrasion, and not 50 parts as might be indicated by the figures for tensile. If the purpose of a tread compound is kept in mind, some tensile strength must be sacrificed to obtain better abrasion resistance, the property principally desired.

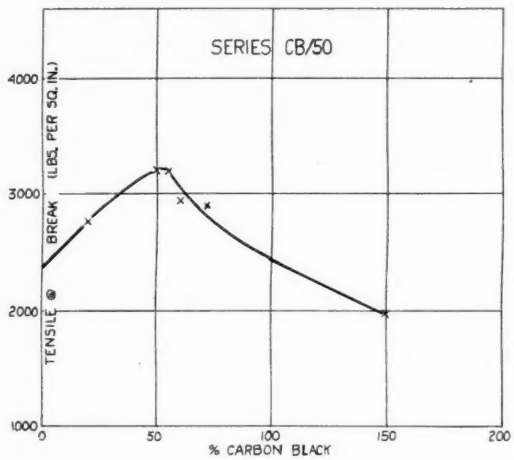
A second series of mixtures was set up varying the amount of carbon black in a mixture containing 50 parts of Naftolen R100 in order to check the shape of the curves for Series CB/30. The formulas and physical data for the mixtures in this series (Series CB/50) are given in Table 6 and in Figure 6 (tensile at break) and Figure 7 (abrasion). The trend for the curves representing the physical data of this series of mixtures is identical with the trend of the curves for Series CB/30. The course of the curve for abrasion is even more distinct, proving that the results in the first series of mixtures were not accidental, but seem to indicate the general behavior for compounds of this character.

Mixtures in Series CB/30 and Series CB/50 were made at different times. The components used were not from the same shipment. Therefore no conclusions are drawn from comparison of the absolute figures from these two series.

Varying the Amount of Sulphur

Mixture 8 of Series CB/30, which was selected as the best mixture according to the abrasion figure, was taken as a basis for Series CB/30-S, and appears in this series as Mixture 6. (The original four parts of sulphur in this compound had been used in accordance with previous experience that the optimum amount of sulphur was in

Fig. 6



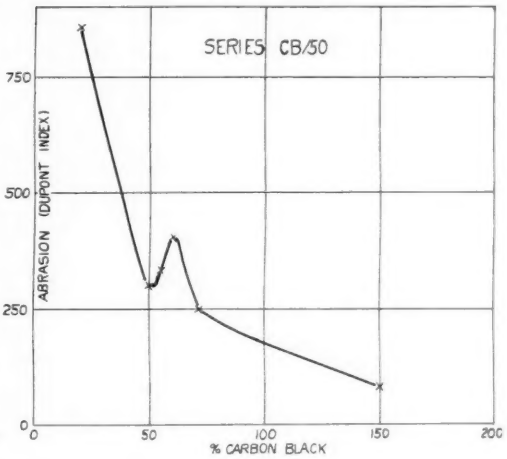


Fig. 7

this range.) Table 7 gives the composition and the physical data. It was found that 3.8 parts of sulphur was the optimum amount. It is of note that the mixture with 3.8 parts of sulphur shows the optimum figure for both tensile and abrasion.

Summary

A study was made of Naftolen as a plasticizer and extender for crude rubber in carbon black compounds, and it was shown that:

1. Naftolen can be classified as a true extender for crude rubber in carbon black compounds; while other substances compared (pine tar, mineral rubber, and mineral oil) cannot;
2. Large amounts (70 parts of Naftolen R100 on 100 parts of crude rubber) could readily be incorporated into a mix giving physical properties of the cured stock within the range of practical usability;
3. Optimum abrasion resistance for a compound of the investigated type is associated with a higher carbon black content (65 parts of Micronex in 100 rubber plus 30 Naftolen R100) than suggested by the optimum for tensile strength (50 parts of Micronex);
4. Naftolen-containing carbon black compounds require a shorter cure than the compounds containing the other plasticizers investigated;
5. Tensile strength and abrasion resistance plotted against the per cent of plasticizer are both represented by straight lines in the case of Naftolen, (it was suggested that this property is characteristic of a rubber extender);
6. The curve for abrasion index plotted against the per cent. of Micronex, in a compound of the type examined, exhibits two minima.

Acknowledgment

The data given in this article have been collected in V. L. Smithers Laboratories. The authors wish to acknowledge the excellent cooperation received from all members of Smithers organization.

Synthetics from Farm Crops

SYNTHETIC rubber from farm crops was the subject of a statement, prepared by Leo M. Christensen, of the University of Nebraska, and presented to Congress on January 22 by Representative Harry B. Coffee, of Nebraska. Mr. Coffee stated that arrangements are being made through the Bureau of Chemistry and Soils to pool the information of Dr. Christensen and his associates with information and data that have been obtained at the regional laboratory at Peoria, Ill., where the results of this research work will be utilized in expediting a pilot-plant test. The following summarizes his statement.

The Polish process for producing synthetic rubber is understood to involve the conversion of ethyl alcohol (from farm crops) to butadiene by a vapor-phase catalytic method. A program of research instituted in the United States in August, 1939, contemplated the use of 2,3-butylene glycol to make butadiene for synthetic rubber.

The principal steps involved in the new process are: Preparation of 2,3-butylene glycol by the fermentation of sugars or starches (from corn, wheat, rye, sorgo, potatoes, sugar beets, and sugar cane); evaporation of the solution to one-third of its original volume; removal of glycol by solvent extraction or distillation; and conversion of the glycol to butadiene by means of a vapor phase catalytic process. In the dehydration of the glycol, 85% of theoretical conversion has been obtained in one pass, the balance of the glycol remaining as such. The butadiene obtained is so pure that no further treatment is needed before its use to prepare synthetic rubber. Attention has also been given to the preparation of several vinyl compounds from alcohol and glycol, and two of these are known to be satisfactory for interpolymerization with butadiene to make rubber.

The two principal rubber ingredients can be made from farm crops at no more than 10¢ per pound. Two hundred bushels of grain (56-pound bushels) will yield about one ton of rubber. Thus from 5% of the average corn crop (2,500,000,000 bushels) can be made 600,000 tons of rubber. It is indicated that with adequate financing and all obstacles removed, it is possible to have commercial production in about one year. About 15,000 tons of steel and 5,000 tons of copper would be required for the necessary raw material plants. The interpolymerization plants now being built would serve just as well in a program designed to use farm crops as the raw materials.

Colloidal Carbon Compounding for Conservation

C. R. Haynes[1]

THE conservation of rubber has always been a primary consideration to the factory compounder. Except for a brief period in the early '30s, rubber has always been the most expensive ingredient entering into a rubber compound in important volume. It has regularly been the compounder's task to balance his formulas so that necessary physical properties are consistently maintained with minimum use of the valuable basic commodity. Today the urge for conservation extends beyond the question of economy and may actually enter the zone of diminishing returns. This point leads to questions as to what is true conservation under the political and economic conditions of the present time.

In approaching this vital subject of conservation there are many angles to consider. For essential military purposes exact conditions cannot be accurately calculated in advance. A greater factor of safety imparted by an exceptionally high-grade compound may be the means of bringing an aviator and his plane safely back to the base, may increase maneuverability, and prolong the useful life of other essential war material.

On the other hand, what are the more important points in connection with civilian goods? For example—should a camelback repair tread and recapping stock be capable of 6,000, 8,000, 12,000, or 20,000 miles of service? Which quality of retreading stock will best balance the mileage expectancy of the average carcass available for repair? While it is obviously not conservation to skimp on quality in any essential component of a vital defense assembly, the ideal rubber compound of today is that made with the least amount of rubber consistent with service required, allowing in defense materials an ample margin of safety.

Fortunately the compounder has three important classes of quality-improving ingredients available for rubber: namely, organic accelerators, antioxidants, and reenforcing pigments. In the interests of economy and conservation it is desirable to utilize mineral and organic fillers and regenerated rubber. It is the problem of the compounder to offset the deteriorating effects of these extenders by full use of materials capable of improving quality.

It is perhaps worthwhile to review briefly the history of the development of the modern tire and to consider the conservation already accomplished. Not overlooking the part played by accelerators and antioxidants, and by improved constructions in cord fabric, carbon black has undoubtedly made the greatest single contribution and is the most outstanding quality-improving ingredient used in rubber goods.

Back around 1910 and 1912 when automobile tires were made with square woven fabric, and before accelerators were widely used and when antioxidants were unknown, the tread compound consisted essentially of rubber mildly reenforced with zinc oxide. Sulphur was left unaided to effect vulcanization or, if assisted, forced to rely on the questionable benefits of lime or magnesia. Such tires, while approximately balanced as between tread and car cass, were guaranteed for only 3,500 miles. This was later advanced to 5,000, the improvement reflecting largely the addition of organic accelerators. To provide a tire with longer life it was necessary to secure a carcass which could withstand the strains and shocks of road service, and also to apply to such carcass a tread capable of far greater wearing qualities and resistance to abrasion. Carcass improvement was secured through the adoption of cord fabric, and at about the same time the pioneering steps were taken in utilizing a certain type of carbon black as a reenforcing agent for rubber, partially replacing the zinc oxide.

The reenforcement of rubber by carbon black can, in its simplest terms, be pictured as a rubber structure glued together by carbon particles. The rubber-carbon bond will be visualized as actually stronger than the individual rubber units. To draw a parallel it is well known that two pieces of wood may be glued together in such a way that when force is applied, the fracture occurs inside the wood rather than at the joint. To form a complete picture, however, vulcanization effect must also be considered. Through this process, sulphur is combined chemically and increases the strength and stabilizes the rubber units. With carbon black present a bond is also formed between the units, and as in the case of the two pieces of wood, this bond is even stronger than the inherent strength of the individual rubber units.

Back in the time before carbon black was generally used, the old 30 x 3.5 white tire, as used on the rear wheels of the small car of that day, cost the consumer $35 per tire. The conventional guarantee in those days was only 3,500 miles, as already mentioned. While many tires gave less mileage and soon went to the reclaimer by way of the manufacturer's adjustment department, few tires produced substantially more than the guaranteed mileage. Calculating back to the cost per single mile, the startling figure of 1¢ per mile per tire is indicated. The modern passenger tire designed for light cars of comparable weight is the 6.00 x 16, and for this in first-grade quality the consumer paid an average price of $10. Twenty-five thousand miles is not too high a figure to state as a good average, and this brings the tire cost per mile down to $^1/_{25}$¢. Roughly, tire mileage has been increased by 700%, and the tire of today costs less than one-third the figure of 1912.

Beyond all this is the fact that the 25,000-mile tire has saved hundreds of thousands of tons of rubber. As early as 1919 the carbon black tread had been generally adopted, and in the 21 years from 1919 to 1940 a total of approximately 11 billion pounds of carbon black was used in pneumatic tires. The value, on the basis of an average crude rubber price of 23.7¢ per pound can be taken as approximately 2½ billion dollars. Stated on a yearly basis, the rubber manufacturers' bill for his basic raw material in tires averaged right around 125 million dollars.

Other considerations are necessary to a complete analysis. The tire of the present day has, generally speaking, a two-inch smaller peripheral diameter in combination with a 70% larger cross-section. Thus the modern tire represents much greater cubical content and naturally uses somewhat more crude rubber. Further, the small-car tire of today weighs 20 pounds or more in spite of lower gravity tread stock; whereas the old 30 x 3.5 would weigh 13½ pounds if covered with black tread and sidewall. Allowing for other considerations, an estimate of

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50% more rubber is a fair estimate for the modern tire. However, even with a fair allowance for the points just mentioned, it is calculated that tire manufacturers of the U.S.A. would use 600 million dollars worth of crude rubber per year instead of 125 million dollars worth, if tire mileages had remained at the 1912 level. This means that the country has saved 475 million dollars per year. Even though we have now become accustomed to hearing of dollar values running into the billions, the figures cited are of such magnitude as to raise the crucial question: Without the colloidal carbon reenforcement of rubber could the automotive industry have reached its present gigantic proportions?

In compounding passenger tire treads for maximum reenforcement, carbon black has been generally brought to the point of 50 to 55% on the rubber. In this connection the selection of the type of black to be used raises a number of interesting points: Is the mill room equipment adequate to allow the compounder complete freedom of action? Because of the necessity to obtain definite physical properties in the uncured stock and thus to avoid a piling up at some bottleneck, must he consider ease of mixing, temperature of the batch, plasticity, rate of extrusion and smoothness of the extended stock, tendency to scorch, or whatever may contribute toward manufacturing a product of optimum quality under his limiting conditions?

By successively changing two of the ingredients of a stock, either in type or in amount, it is frequently possible to get a series of workable compounds each having its characteristic strong and weak points. The compounder can so vary the type and proportion of reenforcing black and amounts of softening or plasticizing components as to produce a number of stocks which will show good road performance.

There are three important and distinctly different types of channel black designed for use in rubber. These represent small differences in particle size, combined with minor differences in surface chemistry. By far the most generally used is the type which represents the intermediate of these three grades, and in which there is a happy balance of reenforcement, hysteresis effect and processibility. More recently recognition of better electrical conductance in the finer and more reenforcing type has developed a wider application of this variety to the treads of passenger car tires. On the other hand, the increasing importance of truck tires even before inception of the defense program and prior to development of the present emergency, also placed emphasis on the third or coarser type, principally on account of the necessity of low hysteresis stocks for truck tire treads.

At the same time it is an established fact that passenger tires of excellent quality have been made with all three types, although this work necessarily involves careful adjustment of black proportions and also proper selection and adjustment of the proportions of fatty acid activators and tack producing softeners.

A natural and most important question at the present time is how much further can the black loading of tread stock be increased? While the range of 50 to 55% is well established in passenger car sizes and is strictly representative of the bulk of the production, occasionally instances are observed where the compounder has not availed himself of the economic advantages of these higher loadings. While the indicated course of his experiments is entirely obvious, the answer to the question as to whether similar results can be produced with higher loading of a relatively coarse and easy processing type of black to those obtained with a finer particle, more reenforcing type has not yet been entirely supplied. Laboratory data have been developed which indicate that a 55-part loading of a carbon black of good hysteresis and good processing characteristics can reasonably be expected to produce road performance substantially equal to a 50-part loading of the highest reenforcing type, and the stocks in the average mill room, can be as readily handled.

In the case of an advance of carbon content from 50 to 55% by weight, 2.8 volumes are added to the compound. Rubber by volume drops from 73.8 to 72.5%, and this drop represents a saving of nearly 2% of rubber employed. Certainly the fullest possible use should be made of the domestic carbon colloid in conserving the imported and now scarce colloid which is the basic material of the rubber industry.

During the present emergency while the supply of crude rubber is greatly curtailed, the available reclaimed rubber is very fortunately limited only by the capacity of the reclaimers to produce their product. This condition will continue for at least the next few years. The established principles of rubber reenforcement apply with equal force to reclaimed stocks. Just as natural rubber is virtually useless for many purposes, except when reenforced with carbon black, compounds made with regenerated rubber need black if designed for dynamic use.

Broadly speaking, the rubber hydrocarbon of reclaim requires the same minimum proportion of carbon black for any given type of stock as does new rubber. In making practical application of this principle, allowance must be made for the fact that in some reclaimed stocks a considerable percentage of the rubber hydrocarbon is already in combination with black. The black that is added reenforces that portion of the rubber surface which may be considered as free rubber hydrocarbon.

More than 80% of the total available reclaim is derived from tires and tubes. By far the greatest proportion of this is reclaimed directly from debeaded tires. This whole tire stock may be pictured as consisting of a mixture of tread rubber blended with carcass and cushion gums, with the tread essentially maintaining its identity. The portion of rubber hydrocarbon originating in the tread is already compounded with the carbon although perhaps not to its full saturation. On the other hand the rubber substance introduced by the carcass and cushion contains little or no black and should be considered as the base available for further reenforcement. This component has been referred to above as the "free rubber hydrocarbon", and it is this portion of the reclaim which benefits most by further compounding with channel black.

Studies on the direct carbon loading of whole tire reclaim show that the black already present is inadequate and demonstrate the need of reenforcement. Analyses of reclaimed rubber show that a tire made with a typical tread containing 50 or more parts of black to 100 of new rubber will, after average road service, yield on reclaiming a composition averaging 60% hydrocarbon and also containing an average of 12½ parts of tightly bound carbon. Of the 60 parts of rubber, however, only 25 have already been reenforced. Thirty-five parts constitute free hydrocarbon and require colloidal carbon reenforcement.

Similar approach to the reenforcement of other important items in the reclaimers' line-up assures equally good results. Inner tube and straight carcass reclaim, which between them represent 15% or more of the available regenerated rubber, offer even greater possibilities for loading with black since stocks from which they are made were not originally reenforced with carbon.

A one-time standard product of the reclaiming industry was whole tire reclaim compounded in the reclaiming plant with 16⅔ parts of carbon black. This figure was

based on an optimum determined by considerations of practical handling in the reclaiming plant. More recently compounders have preferred to make their own additions of black, but this product is cited as an example of general recognition of the importance of reenforcement of reclaimed rubber with carbon black.

In some reclaiming operations either channel or semi-reenforcing black is added up to 3%, principally to break down lumps and to smooth out the product. This comparatively small amount does not reenforce the rubber hydrocarbon to its optimum, and further dosage by the consumer is clearly indicated.

Semi-reenforcing blacks are widely used in the compounding of natural rubber, synthetic rubber, and blends including reclaim. The liberal use of these blacks greatly improves the tubing and molding qualities without producing excessive hardening effect, and yet these blacks reenforce sufficiently to produce stress-strain, abrasion, and other qualities required over a broad line of important mechanical goods. Outstanding as regards hysteresis and aging effect, the semi-reenforcers lend themselves admirably to many defense products, including the new synthetic rubbers and neoprene and "Thiokol." The ability of this type also to produce synthetic stocks having low heat build-up is a point deserving special emphasis.

However in many cases combinations with channel black are required to produce the requisite balance which cannot possibly be obtained by using either type of black alone. In all of these instances processibility is an important question. This includes not only ease of extrusion, but ability of stocks to maintain the desired form in the uncured state and to lend themselves easily to subsequent manufacturing steps.

From the point of view of dispersion, loading capacity is, of course, the most important consideration. Against a loading index of 50 for the most generally used type of channel black, a typical semi-reenforcing carbon presents a loading index of 100. While used in high-cost synthetics principally for the quality reasons outlined above, the semi-reenforcers have at the same time made a very important contribution toward conservation of these highly valuable materials.

Important defense uses of "Thiokol," neoprene, and other synthetic stocks requiring semi-reenforcing black alone or in combination with channel black include cable, hose, oil seals and bushings, motor mounts, packing, and gaskets. These are all essential defense applications generally involving oil resistance. Similarly, a number of specialties of indirect defense importance are prepared from such compositions for the oil industry and for oil field work, for the chemical industry and for other essential industrial lines. Outstanding examples of the latter are pump pistons and gaskets, tank liners, and roll covers.

As a group, synthetic rubbers are generally harder to handle and process than is natural rubber. As a result, the semi-reenforcing blacks are used in large quantities since they actually diminish the tendency to scorch and run rough in the course of processing. On the basis of indications presented by recent compounding trends, increasingly greater use of the semi-reenforcing carbons is indicated.

Amendment No. 1 to Order M-13

The synthetic rubber order, M-13, was amended and extended January 2. While the language of the Order is changed, the only actual changes in its effect are to include in its provisions new types of synthetic rubber developed since the original order was written and to extend it indefinitely. The Order was to have expired as of December 31, 1941.

All types of synthetic rubber are subject to complete allocation by the terms of the revised Order. The effective date of the allocations is January 1, 1942, except for the polyisobutylene types for which the operative date is February 1, 1942.

Synthetic rubber has been produced in this country since 1931. Production was small until war demands caused a large expansion in 1941. Production in 1940 was about 4,000 tons and is expected to reach a rate of more than 140,000 tons by the end of 1942. Practically all present synthetic rubber, about 12,500 tons in 1941, is used for war production in self-sealing gasoline tanks for airplanes, linings for tanks, and the like.

The Order originally was issued on June 9, 1941, and became effective July 1. Amendment 1 follows.

AMENDMENT NO. 1 TO GENERAL PREFERENCE ORDER NO. M-13 TO DIRECT THE USE AND DISTRIBUTION OF SYNTHETIC RUBBER[1]

(a) Section 938.1 (General Preference Order No. M-13) is hereby amended to read as follows:

WHEREAS, the national defense requirements have created a shortage of Synthetic Rubber, as hereinafter defined, for defense, for private account and for export, and it is necessary, in the public interest and to promote the defense of the United States, to conserve the supply and direct the distribution thereof;

NOW, THEREFORE, IT IS HEREBY ORDERED THAT:

938.1 GENERAL PREFERENCE ORDER (a) *Definitions.* For the purposes of this Order:

(1) "Synthetic Rubber" means all neoprenes; all butadiene types, such as the materials known by the trade names of Hycar, Perbunan, Chemigum, and Buna "S"; organic polysulphides known by the trade names of "Thiokol"; butyl rubber; polyisobutylene, such as the material known by the trade names of Vistanex and Synthetic "100"; and the material known by the trade name of "Thiokol RD."

(2) "Producer" means any person engaged in the production of Synthetic Rubber and includes any person who has Synthetic Rubber produced for him pursuant to toll agreement.

(b) *Applicability of Priorities Regulation No. 1.* This Order and all transactions affected thereby are subject to the provisions of Priorities Regulation No. 1, as amended from time to time, except to the extent that any provision hereof may be inconsistent therewith, in which case the provisions of this Order shall govern.

(c) *Restrictions on Deliveries.* On and after January 1, 1942, no deliveries of Synthetic Rubber (not including polyisobutylene, such as the material known by the trade names of Vistanex and Synthetic "100", as to which the operative date shall be February 1, 1942) shall be made by any Producer, except as may be specifically directed by the Director of Priorities; and no person shall accept delivery of Synthetic Rubber made in violation of the foregoing clause. At the beginning of each calendar month the Director of Priorities will issue to all Producers specific directions covering deliveries of Synthetic Rubber which may be made by such Producers during such month. Such directions will be made primarily to insure the satisfaction of all defense requirements and to provide an adequate supply for essential civilian uses, and they may be made at the discretion of the Director of Priorities without regard to any preference rating assigned to particular contracts or orders.

(d) *Intra-Company Transactions.* The prohibitions or restrictions contained in this Order with respect to deliveries shall, in the absence of contrary direction, apply not only to deliveries to other persons, including affiliates and subsidiaries, but also to deliveries from one branch, division or section of a single enterprise to another branch, division

(*Continued on page* 512)

[1] Title 32—National Defense Chapter IX—Office of Production Management, Subchapter B—Priorities Division. Part 938—Synthetic Rubber.

Supplementary Order No. M-15-C To Restrict Transactions in New Rubber Tires, Casings, and Tubes[1]

WHEREAS, the further importation of crude rubber is imperiled, and

Whereas by Executive Order No. 8629 of January 7, 1941, and Executive Order No. 8875 of August 28, 1941, the Office of Production Management has been created and charged with certain authority and duties with regard to defense and civilian supply, priorities and allocations, and

Whereas by Executive Order 8734 of April 11, 1941, the Office of Price Administration has been created and charged with certain authority and duties with regard to consumer protection, price control, and the prevention of price spiraling,

Now, therefore, by virtue of the authority vested in the Office of Production Management by the aforementioned Executive Orders 8629 and 8875, and in order better to enable the Office of Price Administration to perform the duties with which it is charged under the aforementioned Executive Order 8734,

It is hereby ordered, That:

940.4 *Supplementary Order M-15-c*—(a) *Delegation of authority to Office of Price Administration.* In addition to the powers expressly vested in the Office of Price Administration elsewhere in this Order, the Office of Price Administration is hereby authorized to exercise, in the administration of this order, the powers of the Office of Production Management with respect to:

(1) The granting of exceptions and exemptions,

(2) The interpretation of this Order,

(3) The prescribing of forms for reports,

(4) The prescribing of requirements with respect to the keeping of records,

(5) The making of audits, inspections, and investigations, and

(6) The amendment of this Order in the following respects:

(i) Amendment of paragraph (c) by changing the types of persons or tires included in or excluded from paragraph (c) and List A[2] therein referred to:

(ii) Amendment of paragraph (d) by changing the method of fixing quotas:

(iii) Amendment of paragraphs (e), (f), (i), (j), and (k) in any manner, with respect to the present subject matter thereof; and

(iv) Any other amendments of this Order made necessary by the changes specifically authorized above.

Power to revoke this Order and to make amendments other than those hereby authorized is reserved in the Office of Production Management. Subject to the terms of this Order, the Office of Price Administration may exercise the authority and duties hereby delegated to it, through such departments, agencies, officers, or employes of the United States or any state as it is or may be hereafter authorized to utilize, and in conformity with Rationing Regulation No. 1 and such other amendatory or supplementary rules and regulations as it may prescribe.

(b) *Definitions.* For the purposes of this Order:

(1) "Persons" means any individual partnership, corporation, association, government agency or subdivision, or other form of enterprise.

(2) "Rubber" means compounded liquid latex which on December 11, 1941, had not been processed or mixed in such manner that further processing is necessary to prevent early spoilage, and all forms and types of crude rubber and liquid latex in crude form, and all forms of reclaimed rubber and scrap rubber as well, but does not include balata, gutta percha, gutta siak, gutta jelutong, and pontianak.

(3) "Tire," "Casing," and "Tube" means any tire, casing, and tube capable of being used on any automobile, truck, bus, motorcycle or farm implement.

(4) "New" as applied to tires, casings, and tubes, means a tire casing or tube that has been used less than 1,000 miles.

(c) *Prohibition on deliveries of new rubber tires, casings, and tubes except to persons possessing certificates.* (1) Except as provided in this paragraph and in paragraphs (g) and (h) hereof, or in regulations hereafter issued by the Office of Price Administration, no person shall sell, lease, trade, lend, deliver, ship, or transfer new rubber tires, casings, or tubes, and no person shall accept any such sale, lease, trade, loan, delivery, shipment or transfer of any such new rubber tires, casings, or tubes. (The provisions of this paragraph shall apply to all new rubber tires, casings, and tubes, whether such new rubber tires, casings, and tubes are at the date of issuance of this Order already manufactured, or whether such new rubber tires, casings, and tubes are manufactured in the future.)

(2) Except as provided in subparagraphs (3) and (4) of this paragraph (c), a person selling new rubber tires, casings or tubes at a retail store, outlet, or premises, which for purposes of this Order shall mean a store, outlet or premises from which transfers or deliveries are made predominantly direct to consumers, may sell, lease, trade, lend, deliver, ship or transfer any new rubber tire, casing, or tube from such premises to a person possessing a certificate authorizing such purchase issued by the Office of Price Administration.

(3) Except as provided in paragraphs (f) and (g), no person (even upon the presentation of a certificate) shall sell, lease, trade, lend, deliver, ship or transfer any new six-ply or eight-ply rubber tires or casings of a size less than 7.00 x 20.

(4) Except as provided in paragraphs (g) and (h) hereof, or in regulations hereafter issued by the Office of Price Administration, no person shall sell, lease, trade, lend, deliver, ship or transfer new rubber tires, casings or tubes from a factory or warehouse or other premises not constituting a retail store, outlet or premises, even upon the presentation of a certificate, provided that a person selling exclusively to consumers, and only such a person, may transfer, or ship to his own retail premises. Authorization to make sales, leases, trades, loans, deliveries, shipments or transfers prohibited by this subparagraph (c) (4) may hereafter be granted by the Office of Price Administration. The purpose of such authorization, when granted will be to enable dealers to replenish their inventories of new rubber tires, casings, and tubes, and in order to accomplish that purpose, permitted shipments to dealers will be based upon certificates and receipts issued pursuant to paragraphs (e), (f), and (g) of this order and held by such dealers as evidence that new rubber tires, casings, and tubes have been sold pursuant to this Order.

(5) Anything in this paragraph (c) to the contrary notwithstanding, any dealer regularly engaged in selling new rubber tires, casings, and tubes exclusively at retail may, on and after January 5, 1942, sell such tires, casings, and tubes (without certificates) to another dealer, to the Reconstruction Finance Corp., to the Rubber Reserve Corp., to the Procurement Division of the United States Treasury, or (with the express approval of the Office of Price Administration) to a manufacturer of new rubber tires, casings, or tubes.

(6) Anything in this paragraph (c) to the contrary notwithstanding, any common carrier which on December 11, 1941, was in possession of shipments of new rubber tires, casings, and

[1] Title 32—National Defense Chapter IX—Office of Production Management Subchapter B—Priorities Division. Part 940—Rubber and Products and Materials of Which Rubber Is a Component.

[2] For List "A", see INDIA RUBBER WORLD, Jan. 1, 1942, p. 389.

tubes consigned to a consignee may (without certificates) deliver such tires, casings, and tubes to such consignee.

(d) *Provision for allocation of certificates among the states and counties.* The Office of Price Administration shall set state by state quotas of permissible sales of new rubber tires, casings, and tubes, except that tires sold pursuant to paragraphs (f), (g), and (h) of this order shall not be included in such quotas. Each state's quota shall be divided among the counties of that state, and may be further subdivided if necessary, the method of division to be specified by the Office of Price Administration. These state and county quotas shall be announced from time to time, and shall be based upon registration of commercial vehicles, adjusted for such factors as the Office of Price Administration may consider necessary.

(e) *Acquisition of new rubber tires, casings, and tubes by persons in the categories enumerated in List A attached hereto.* Any person who believes that the vehicle for which he wishes to acquire new rubber tires, casings, or tubes is included in one of the categories enumerated in List A attached hereto may apply to the Office of Price Administration for a certificate permitting him to purchase, lease, trade, borrow, or accept delivery, shipment or transfer of new rubber tires, casings, or tubes. Such permission may be granted by the Office of Price Administration upon a showing by the applicant of the following facts:

(1) That the vehicle on which the new rubber tire, casing, or tube is to be mounted is included in one of the categories enumerated in List A, and thus constitutes an "eligible" vehicle.

(2) That the vehicle on which the new rubber tire, casing, or tube is to be mounted cannot be replaced by a vehicle owned or operated by or subject to the control of the applicant, which is equipped with serviceable tires and tubes and which is not fully employed for a use specified in one or more of the categories enumerated in List A.

(3) That the new rubber tire, casing, or tube is to be installed at once on a wheel or rim, to replace a tire, casing or tube no longer serviceable.

(4) That the tire, casing, or tube, when added to all other tires, casings, and tubes in the applicant's possession, whether unmounted or mounted on a vehicle, and when that total is applied only to eligible vehicles, does not add up to more than one spare tire, casing or tube of a given size for each eligible vehicle.

(5) That the existing tire, casing, or tube cannot be recapped, retreaded or repaired for safe use at speeds at which the applicant many reasonably be expected to operate, or that such recapping, retreading or repairing cannot be obtained without inordinate delay.

(6) That the applicant agrees to trade in replaced tires, casings, and tubes on new tires, casings, and tubes purchased under this Order, or to dispose of replaced tires, casings, and tubes as may otherwise be directed by the Office of Price Administration.

Upon being satisfied that all of these facts exist, the Office of Price Administration may issue to the applicant a certificate stating the number and type of new rubber tires, casings, and tubes which the applicant is authorized to acquire. Such certificate shall be recognized by any person having new rubber tires, casings, or tubes for sale, and no sale, lease, trade, loan, delivery, shipment or transfer of new rubber tires, casings, or tubes (except as provided in paragraphs (c), (g), and (h) hereof shall be made except on the basis of such a certificate.

(f) *Acquisition of "obsolete" type new rubber tires, casings, and tubes.* Any person wishing to acquire "obsolete" type new rubber tires, casings, or tubes may apply to the Office of Price Administration for permission to purchase, lease, trade, borrow, or accept delivery shipment or transfer of such "obsolete" type new rubber tires, casings, or tubes. Such permission may be granted by the Office of Price Administration upon a showing by the applicant of items (3) and (6) of paragraph (e) hereof. Upon being satisfied that all of the facts required by items (3) and (6) exist, the Office of Price Administration may issue to the applicant a certificate stating the number of types of "obsolete" type new rubber tires, casings, and tubes which the applicant is authorized to acquire. Such certificate shall be recognized by any person having "obsolete" type new rubber tires, casings, or tubes for sale, and no sale, lease, trade, loan, delivery, shipment, or transfer of "obsolete" type new rubber tires, casings, or tubes (except as provided in paragraphs (c), (g), and (h) hereof) shall be made except on the basis of such a certificate.

As here used, the word "obsolete" refers to tires, casings, and tubes of the following sizes, and no others:

525-19.	525-20.	700-21.
525-550-19.	550-20.	500-22.
550-19.	600-20.	600-22.
600-19.	600-650-20.	750-14.
600-650-19.	650-20.	30 x 3.
650-19.	440-450-21.	30 x 3½.
700-19.	440-21.	31 x 4.
750-19.	450-21.	32 x 4.
450-20.	475-21.	33 x 4.
475-20.	500-21.	32 x 4½.
450-475-500-20.	525-21.	33 x 4½.
500-20.	600-21.	34 x 4½.
	650-21	

(g) *Sales to the Army, Navy, designated governments, and designated governmental agencies.* Nothing in this order shall prevent any person from making a sale, lease, trade, loan, delivery, shipment or transfer of new rubber tires, casings, or tubes (without certificates) to or for the account of the following:

(1) The Army or Navy of the United States, the United States Maritime Commission, the Panama Canal, the Coast and Geodetic Survey, the Coast Guard, and Civil Aeronautics Authority, the National Advisory Commission for Aeronautics, the Office of Scientific Research and Development;

(2) The government of any of the following countries: the United Kingdom, Canada, and other Dominions, Crown Colonies and Protectorates of the British Empire, Belgium, China, Greece, the Kingdom of the Netherlands, Norway, Poland, Russia and Yugoslavia:

(3) The government of any country listed above, or any other country, including those in the Western Hemisphere, pursuant to a contract or order placed by any agency of the United States Government under the Act of March 11, 1941, entitled "An Act to Promote the Defense of the United States." (Lend-Lease Act.)

(4) Any person holding an A-3 or higher preference rating for such new rubber tires, casings, or tubes, issued on a PD-3 certificate: *Provided*, That the person holding such preference rating shall also possess a signed statement from the official who countersigned such PD-3 certificate to the effect that the vehicle on which the new rubber tires, casings, or tubes are to be used, was, during the six months' period preceding the issuance of the statement, engaged to the extent of 75% or more in work done for the Army or Navy of the United States.

Any person, government, or governmental agency acquiring a new rubber tire, casing, or tube, under this paragraph (g) shall execute and deliver to the person from whom such tires, casings, or tubes was acquired a receipt evidencing the transaction, the receipt to be in such form as the Office of Price Administration may direct.

(h) *Sales of new rubber tires, casings, and tubes as part of the original equipment of new vehicles.* Nothing in this order shall prevent any person from selling new rubber tires, casings, or tubes (without certificates) as part of the original equipment (excluding spares) of new vehicles, provided that such tires, casings, or tubes, are affixed to such vehicles at the time of their sale, and that such sale is not prohibited by the terms of any order of the Office of Production Management.

(i) *Records.* All persons affected by this order shall keep and preserve for not less than two years accurate and complete records concerning inventories, production and sales of new rubber tires, casings, and tubes, including sales covered by paragraphs (c), (g), and (h) of this order.

(j) *Audit and inspection.* All records required to be kept by this order shall, upon request, be submitted to audit and inspection by duly authorized representatives of the Office of Price Administration.

(k) *Reports.* All persons affected by this order shall make such reports as may from time to time be required by the Office of Price Administration and the Office of Production Management, including Dealers Report of Stocks of New Tires and Tubes on Hand on December 12, 1941 (PD-216), required to be mailed not later than December 31, 1941.

(l) *Violations.* Any person who wilfully violates any provision of this order or who by any act or omission falsifies records

to be kept of information to be furnished pursuant to this order may be prohibited by the Office of Price Administration from receiving further deliveries of any new rubber tires, casings, or tubes. Such further action may be taken by the Office of Price Administration as it is deemed appropriate, including a recommendation for prosecution under section 35A of the Criminal Code (18 U.S.C. 80), and a recommendation to the Office of Production Management that the violator be prohibited from receiving further deliveries of any other material subject to allocation.

(m) *Inapplicability of Priorities Regulation 1.* Except to the extent that such provisions are set out herein or in regulations issued hereunder, the provisions of Priorities Regulation 1 and of any other regulations heretofore or hereafter issued by the Office of Production Management shall not apply to this order.

(n) *Effective date.* This order shall take effect immediately. (P.D. Reg. 1, Aug. 27, 1941, 6 F.R. 4489; O.P.M. Reg. 3, March 8, 1941, 6 F.R. 1596, as amended Sept. 12, 1941, 6 F.R. 4865; E.O. 8629, Jan. 7, 1941, 6 F.R. 191; E.O. 8875; Aug. 28, 1941, 6 F.R. 4483; sec. 2 (a), Public No. 671, 76th Congress, Third Session, as amended by Public No. 89, 77th Congress, First Session; sec. 9, Public No. 783, 76th Congress, Third Session)

Issued this 27th day of December, 1941.

DONALD M. NELSON,
Director of Priorities.

Approved:
WILLIAM KNUDSEN,
Director General.

Approved:
SIDNEY HILLMAN,
Associated Director General.

Approved:
ROBERT P. PATTERSON,
Under Secretary of War.

Approved:
JAMES V. FORRESTAL,
Under Secretary of the Navy.

Approved:
FRANKLIN D. ROOSEVELT,
The White House.

Date: December 26, 1941.

Amendment No. 1

Section 940.4 (c) is hereby amended by adding thereto the following subparagraph (7):

940.4. Supplementary Order M-15-c.

(c) *Prohibition on deliveries of new rubber tires, casings, and tubes except to persons possessing certificates.*

(7) Anything in this paragraph (c) to the contrary notwithstanding, any manufacturer of new rubber tires, casings or tubes may sell, transfer or deliver, with the written approval of the Director of Priorities of the Office of Production Management, any new rubber tire, casing or tube to a manufacturer of new vehicles to be used as part of the original equipment of such vehicles. Records of such transfers shall be kept and reports in connection therewith shall be made as may from time to time be required by the Office of Production Management.

(32 CFR section 940.4, 6 FR 6792)

This amendment No. 1 shall become effective January 2, 1942.

Issued this 2nd day of January, 1942.

LEON HENDERSON
Administrator

Certified to Be a True Copy of the Original.
JOHN E. HAMM
Deputy Administrator

Amendment No. 2

Section 940.4 (c) is hereby amended by adding thereto the following subparagraph (8):

940.4. Supplementary Order M-15-c.

(c) *Prohibition on deliveries of new rubber tires, casings, and tubes except to persons possessing certificates.*

(8) Anything in this paragraph (c) to the contrary notwithstanding, any person possessing a certificate issued pursuant to paragraph (e) authorizing such person to purchase new rubber tires, casings, or tubes may lease from a manufacturer of new rubber tires, casings, or tubes (and the manufacturer is authorized to lease) the number and size of new rubber tires, casings, or tubes specified in such certificate, provided that the lease is made in pursuance of an agreement to lease such tires, casings or tubes which was in effect on December 11, 1941, or which is made in pursuance of an agreement in renewal of such an agreement in effect on December 11, 1941.

(32 CFR section 940.4, 6 FR 6792)

This Amendment No. 2 shall become effective January 5, 1942.

Issued this 3rd day of January, 1942.

LEON HENDERSON
Administrator

Certified to Be a True Copy of the Original.
JOHN E. HAMM
Deputy Administrator

Rationing Regulation No. 1

This Rationing Regulation is issued pursuant to Supplementary Order No. M-15-c of the Office of Production Management, issued December 27, 1941.

1. The Office of Price Administration may exercise through local tire rationing boards such of the powers vested in it pursuant to Supplementary Order No. M-15-c of the Office of Production Management as it may deem necessary or desirable, including, without limitation on the foregoing, the following powers:

(a) The power to determine whether a given applicant is an eligible purchaser;

(b) The power to determine which of the eligible applicants shall receive tires, up to the quota allotted to the local board.

2. Each such local board shall consist of three members, and shall be called the Local Tire Rationing Board.

3. Members of Local Tire Rationing Boards shall be appointed by the Office of Price Administration, and shall hold their positions as agents of the Office of Price Administration.

4. In appointing members of Local Tire Rationing Boards, the Office of Price Administration may, in its discretion, be guided by the recommendations of State and Local Defense Councils, and may also, in its discretion, appoint as members of such boards state and local officials.

5. Subject to such exceptions as the Office of Price Administration may make, there shall be at least one Local Tire Rationing Board in every county of the United States, and in those counties where (in the opinion of the Office of Price Administration) density of population or other factors makes it impossible for one Board adequately to administer the functions contemplated by Order No. M-15-c, there shall be as many Local Tire Rationing Boards as the Office of Price Administration may consider necessary for the adequate performance of such functions.

6. Further provisions governing the establishment and operation of Local Tire Rationing Boards may be issued by the Office of Price Administration from time to time, provided that such provisions shall be consistent with paragraph 3 of this regulation.

[F.R. Doc. 41-9788; Filed, December 27, 1941; 12:17 p.m.]

Military Rubber Consumption

Last month the Division of Information, OEM, issued a statement on the rubber situation, in which it was stated that in 1941 approximately one-fifth of our total rubber consumption went for military purposes and that this rate is due for a substantial increase this year.

Amendment No. 3 to Supplementary Order No. M-15-B, to Restrict the Use and Sale of Rubber[1]

SUPPLEMENTARY Order No. M-15-b is hereby amended to read as follows:

WHEREAS, the further importation of crude rubber is imperiled; national defense requirements have created a shortage of rubber for the combined needs of defense, private account, and export; action has already been taken to conserve the supply and to direct the distribution of rubber to insure deliveries for defense and essential civilian requirements; and the supply now is and will be insufficient for defense and essential civilian requirements unless its use in the manufacture of products where such use is not absolutely necessary for the defense or essential civilian requirements is prohibited as hereinafter provided;

NOW THEREFORE, IT IS HEREBY ORDERED THAT:

940.3 GENERAL LIMITATION ORDER

(a) *Definitions.* For the purposes of this Order:

(1) "Rubber" means all forms and types of crude rubber (including crepe rubber for soles or any other purpose) and all crude rubber (including scraps and trimmings) contained in any compound which has not been vulcanized, but does not include balata, gutta percha, gutta siak, gutta jelutong, pontianak, reclaimed rubber, cured or vulcanized scrap rubber, and Latex.

(2) "Latex" means the rubber solids contained in liquid latex in crude form, and in compounded liquid latex, which on December 11, 1941, had not been processed or mixed in such manner that further processing is necessary to prevent early spoilage.

(3) "Person" means any individual, partnership, association, business trust, corporation, governmental corporation or agency, or any organized group of persons, whether incorporated or not.

(4) "War Order" means:

(i) Any contract or purchase order for material or equipment to be delivered to, or for the account of:

(aa) The Army or Navy of the United States, the United States Maritime Commission, the Panama Canal, the Coast and Geodetic Survey, the Coast Guard, the Civil Aeronautics Authority, the National Advisory Committee for Aeronautics, the Office of Scientific Research and Development.

(bb) The government of any of the following countries: The United Kingdom, Canada and other Dominions; Crown Colonies and Protectorates of the British Empire, Belgium, China, Greece, the Kingdom of the Netherlands, Norway, Poland, Russia, and Yugoslavia.

(ii) Any contract or purchase order placed by any agency of the United States Government for material or equipment to be delivered to, or for the account of, the government of any country listed above, or any other country, including those in the Western Hemisphere, pursuant to the Act of March 11, 1941, entitled "An Act to Promote the Defense of the United States" (Lend-Lease Act).

(iii) Any contract or purchase order for material or equipment required by the Person placing the same to fill his contracts or purchase orders on hand, provided such material or equipment is to be physically incorporated in material or equipment to be delivered under contracts or purchase orders included under (i) and (ii) above.

(5) "Inventory" of a Person includes the Inventory of affiliates and subsidiaries of such Person, and the Inventory of others where such Inventory is under the control of or under common control with or available for the use of such Person.

(6) "Consume" means to use, process, stamp, cut, or in any manner change the form, shape or chemical composition of any Rubber or Latex.

(b) *General restriction on the use of Rubber.* From the effective date of this Order until otherwise ordered by the Office of Production Management, no Person shall consume any Rubber for any purpose, except [subject to the provisions of paragraph (d)] one or more of the following:

(1) To manufacture products to fill War Orders; provided that no Person shall consume any Rubber to fill any such order until he has forwarded to the Rubber and Rubber Products Branch, Office of Production Management, a report showing:

(i) The name of the Person placing the order and his purchase order number.

(ii) The name of the Person to whom delivery is to be made.

(iii) The article to be manufactured and the quantities thereof.

(iv) The preference rating (if any), and how assigned.

(v) The respective quantities, by weight, of Rubber, Latex, and reclaimed rubber required.

(vi) The specifications (by number, if any).

(vii) The delivery schedules of the articles, in quanties, by months.

(viii) Such other information as may be required from time to time by the Office of Production Management.

(2) To manufacture products of the groups listed in List A; provided that no Person shall consume more Rubber during any calendar month, beginning with February, 1942, in the production of any such groups of products than a percentage of his average monthly consumption of Rubber in producing the same group of products during the twelve months' period commencing on April 1, 1940, and ending on March 31, 1941, the percentage for each group of products being that set forth opposite the heading of such group.

(3) To manufacture products of the groups listed in List B; provided that no Person shall consume Rubber for such purpose without the prior approval of the Office of Production Management.

(c) *General restriction on the use of Latex.* From the effective date of this Order until otherwise ordered by the Office of Production Management, no Person shall consume any Latex for any purpose, except [subject to paragraph (d)] one or more of the following:

(1) To manufacture products to fill War Orders; provided that no Person shall consume any Latex to fill any such order until he has forwarded a report complying with requirements of sub-paragraph (b)(1).

(2) To manufacture products of the groups listed in List C attached; provided that no Person shall consume more Latex during any calendar month, beginning with February, 1942, in the production of any such groups of products than a percentage of his average monthly consumption of Latex in producing the same group of products during the twelve months' period commencing on April 1, 1940, and ending on March 31, 1941, the percentage for each group of products

[1] Title 32—National Defense Chapter IX—Office of Production Management, Subchapter B—Priorities Division. Part 940—Rubber and Products and Materials of Which Rubber Is a Component.

being that set forth opposite the heading of such group.

(3) To manufacture products of the groups listed in List D; provided that no Person shall consume Latex for such purpose without the prior approval of the Office of Production Management.

(d) *Manufacture according to specifications.* Any of the products or materials whose manufacture is permitted by paragraphs (b) and (c) may be manufactured only in conformity with such specifications as may be issued from time to time by the Office of Production Management; provided, that until specifications for particular products or groups of products are issued by the Office of Production Management, the Rubber or Latex content by weight of any such products manufactured by any Person shall not exceed the Rubber or Latex content by weight of identical products manufactured by such Person on December 31, 1941, or on the most recent date prior to December 31, 1941, on which he manufactured that product or group of products.

(e) *General restriction on the sale of Rubber and Latex.* Until otherwise ordered by the Office of Production Management, no Person shall sell, trade or transfer the ownership of any Rubber or Latex, and no Person shall accept any such sale, trade or transfer of ownership, except (1) as expressly permitted by regulations prescribed by Rubber Reserve Co., or (2) in those cases in which specific authorizations may be issued by the Office of Production Management; provided that nothing in this paragraph shall be deemed to prohibit the sale of unvulcanized rubber products which were in finished and marketable form on December 11, 1941, or which have become finished and marketable at any time after that date pursuant to processing not prohibited by any orders or other instructions issued by the Office of Production Management.

(f) *Reports of stocks of Rubber and Latex.* Every Person who owns or has in his possession or under his control on the effective date of Amendment No. 3 of this Order any Rubber or Latex shall within 15 days from such effective date file with the Rubber and Rubber Products Branch of the Office of Production Management a complete report setting forth by grades the amount of Rubber and the amount of Latex so owned, possessed or controlled by him, and the location and ownership thereof.

(g) *Distribution of Rubber among plants.* Each Company (which term when used in this paragraph shall include any corporation together with all other corporations controlling, and all other corporations controlled by, such corporation), which is a processor of Rubber or Latex and which operates plants in more than one community (all plants operated by the same Company in the same community being herein collectively referred to as a "Unit") shall immediately upon any distribution of Rubber or Latex for any calendar month among its Units which is at a ratio which differs materially from the ratio of processing or consumption by such Units during July, 1941, file with the Rubber and Rubber Products Branch of the Office of Production Management, a full report thereof showing clearly the reasons for such departure in ratio of distribution. In any case in which it appears that such change in ratio was not justified or proper, the Office of Production Management will take such action as it may deem appropriate.

(h) *Limitation of Inventories.* No Person shall receive delivery of Rubber or Latex, or products thereof, in the form of raw materials, semi-processed materials, finished parts or sub-assemblies, in quantities which shall result in an inventory of such material in excess of a minimum practicable working Inventory, taking into consideration the limitations placed upon the production of Rubber or Latex products by this Order.

(i) *Miscellaneous provisions.*

(1) *Priorities Regulation No. 1.* This Order and all transactions affected thereby are subject to the provisions of Priorities Regulation No. 1 (Part 944), as amended from time to time, except to the extent that any provision hereof may be inconsistent therewith, in which case the provisions of this Order shall govern.

(2) *Appeal.* Any Person affected by this Order who considers that compliance therewith would work an exceptional and unreasonable hardship upon him, or that it would result in a serious problem of unemployment in the community, or that compliance with this Order would disrupt or impair a program of conversion from non-defense to defense work, may appeal to the Office of Production Management by addressing a letter to the Rubber and Rubber Products Branch, Office of Production Management, Washington, D. C., setting forth the pertinent facts. The Office of Production Management may thereupon take such action as it deems appropriate.

(3) *Applicability of Order.* The prohibitions and restrictions contained in this Order shall apply to the use of material in all articles hereafter manufactured irrespective of whether such articles are manufactured pursuant to a contract made prior or subsequent to the effective date hereof, or pursuant to a contract supported by a preference rating. Insofar as any other Order of the Office of Production Management may have the effect of limiting or curtailing to a greater extent than herein provided the use of Rubber or Latex in the production of any article, the limitation of such other Order shall be observed.

(4) *Violations.* Any Person who wilfully violates any provision of this Order, or who by any act or omission falsifies records to be kept or information to be furnished pursuant to this Order, may be prohibited from receiving further deliveries of any Material subject to allocation, and such further action may be taken as is deemed appropriate, including a recommendation for prosecution under Section 35 (a) of the Criminal Code (18 U.S.C. 80).

(5) *Communications.* All reports required to be filed under this Order, and all communications concerning this Order, shall, unless otherwise directed, be addressed to:

"Office of Production Management
Washington, D. C., Ref: M-15-b"

(j) *Effective Date.* This Order shall take effect on February 1, 1942.

(P.D. Reg. 1 Amended, Dec. 23, 1941, 6 F.R. 6680; O.P.M. Reg. 3 Amended, Sept. 2, 1941, 6 F.R. 4865; E.O. 8629, Jan. 7, 1941, 6 F.R. 191; E.O. 8875, Aug. 28, 1941, 6 F.R. 4483; sec. 2 (a), Public No. 671, 76th Congress, Third Session, as amended by Public No. 89, 77th Congress, First Session.)

Issued this 23rd day of January, 1942.

J. S. KNOWLSON,
Acting Director of Priorities.

LIST A TO SUPPLEMENTARY ORDER NO. M-15-B AS AMENDED

Group 1 ..... 140%
- Conveyer Belts and Belting
- Elevator Belts and Belting
- Flat Transmission Belts and Belting
- Concentrator Belts and Belting
- Hog Beater Belts and Belting
- Industrial V-Belts and Belting
- Chute Lining
- Cleats and Bucket Pads
- Pulley Lagging
- Screen Diaphragms
- Belt Splicing Material

Group 2 ..... 100%
- Polishing Belts and Belting
- Street Sweeper Belts and Belting
- Hatter's Belts and Belting
- Round Belts and Belting

Group 3 ..... 140%
- Acid Hose
- Air Drill Hose
- Chemical Hose
- Dredging Sleeves
- High-Pressure Wired Hose
- Industrial Vacuum Hose
- Oil Suction and Discharge Hose
- Paper Mill Hose
- Pneumatic Hose
- Railroad Hose (all types)
- Rotary Drillers' Hose
- Sand-Blast Hose
- Steam Hose
- Suction Hose
- Welding Hose

Group 4 ..... 100%
Spray Hose
Brewers' Hose
Creamery Hose
Gasoline Tank Wagon Hose
Rubber-lined Tanks, Pipes, and Fittings (hard & soft)

Group 5 ..... 140%
Sheet and Strip Packing
Rubber Covered Rolls (except printing & business machines)
Car Diaphragms
Switchboard Mats and Matting

Group 6 ..... 25%
Gaskets, except for consumers' goods
Molded, Extruded, and Lathe—Cut Goods, except for consumers' goods
Tubing, except for consumers' goods
Chemically Blown Sponge Rubber Goods, except for consumers' goods

Group 7 ..... 80%
Printers' Rollers
Engraving and Printing Plates
Offset Blankets
Cutting Rubbers
Suction Cups for Printers' Equipment

Group 8 ..... 180%
Fire Hose
Mill Hose
Washers and Gaskets for Fire Fighting Equipment
Tubing for Fire Fighting Equipment

Group 9 ..... 100%
Acoustic Aids
Anaesthesia Equipment
Plaster Bowls
Dental Dam
Chip Blower Bulbs
Tubes, Tubing, and Stopples (biological, laboratory, and medical)
Urinals
Surgeon's Gloves
Colostomy Outfits
Pilcher Bags
Orsat Bags
Pessaries
Umbilical Belts
Dilators
Tourniquets
Cautery Bulb Sets
Blood Pressure Equipment
Evacuators
Irrigators
Sinus Bulb Sets
Catheters
Invalid Rings
Operating Cushions
Bedpans
Surgeons' Aprons
Surgical Tape and Bandages
Vaccine Caps
Medicine Droppers
Hospital Sheeting (hospital use)
Trusses, maternity girdles, surgical stockings, and abdominal supports

Group 10 ..... 75%
Water Bottles
Fountain Syringes
Ice Bags
Bulb Syringes (ear, ulcer, nasal, rectal, vaginal, infant, politzer air)
Metatarsal Pads

Group 11 ..... 100%
Nipples
Nursing Bottle Caps
Breast Pumps
Breast Shields

Group 12 ..... 70%
Quarter Lining
Cements for the manufacture and repair of shoes

Group 13 ..... 100%
Electricians' and Industrial Gloves (without fabric), with or without rubberized fabric gauntlets

Group 14 ..... 100%
Deep-Sea Diving Equipment
Occupational Protective Clothing, other than footwear and gloves

Group 15 ..... 60%
Rubberized Fabric for Firemen's and Policemen's Clothing

Group 16 ..... 30%
Plain Oxfords and Lace-to-toe Gym Bals with black toes, foxings, and toe caps only

Group 17 ..... 40%
Waterproof Boots, Pacs, Arctics, Gaiters, and Overshoes made of cloth and black rubber

Group 18 ..... 80%
Hollow Tank Balls and Floats
Washers, including fuller balls and valves, which are used to control the flow of liquids

Group 19 ..... 100%
Vulcanizing Materials, patches, cements, blow-out shoes and similar items for the repair of tires, tire casings, and tubes

List B to Supplementary Order No. M-15-b as Amended

Group 1.
Jar Rings
Container Sealing Compounds

Group 2.
Toplifts and Toplifting Material
Soles and Tops
Soling Material

Group 3.
Compounds for insulating Wire and Cable (except for building wire types R.P. and R.H., and Flexible cord types S., S.J., S.V. and P.O.S.J., either 64 or 32)

Group 4.
Tires, Tire Casings, and Tubes
Truck and Bus
Passenger
Airplane
Bicycle
Motorcycle
Farm Implement
Industrial
Highway Maintenance Equipment
Off the Road

Group 5.
Cements for Retreading and Recapping Tires
Capping Stock
Filler Strip
Stripping Stock
Cushion Stock

List C to Supplementary Order No. M-15-b as Amended

Group 1 ..... 120%
Industrial V-Belts and Belting

Group 2 ..... 100%
Anaesthesia Equipment
Dental Dam
Tubes and Tubing (biological, laboratory, medical)
Surgeons' Gloves
Pessaries
Prophylactics

Group 3 ..... 100%
Electricians' and Industrial Gloves (without fabric) with or without rubberized fabric gauntlets

Group 4 ..... 70%
Cement to be used in the manufacture of new shoes

List D to Supplementary Order No. M-15-b as Amended

Group 1.
Container Sealing Compounds

Group 2.
Tires, Tire Casings, and Tubes

Circo for Plasticizing

A recent report (Bulletin No. 3), prepared by A. B. Hoel, of the Sun Oil Co., Philadelphia, Pa., discusses the use of Circo Light Process Oil as a softener and plasticizer for natural and synthetic rubber. The report emphasizes the importance in the selection of the proper type of plasticizer and points out that ordinary petroleum lubricants do not suffice for effective compounding.[1] Excerpts from the report relating to neoprene and reclaim follow.

In contrast to Circo, ordinary petroleum oils have a very limited compatibility with the neoprenes. In using Circo with Neoprene Types GN or E, the mix should stand for at least 24 hours before vulcanizing to avoid blooming; with over 10% Circo on the neoprene, the period of absorption should be increased to 48 hours or longer. "Brown substitute" permits the absorption of larger quantities of Circo. It is possible to incorporate up to 10% of Circo in Neoprene Type I without appreciable blooming. In Neoprene Type FR compounds, Circo, as a plasticizer, can be used in larger quantities and it increases the cold resistance of the vulcanizate.

In the reclamation of national rubber scrap by the open steam (or pan) process, Circo has satisfactorily been used in percentages varying from five to 30, based on rubber content—the higher amounts produce very soft products. With such reclaim there is a minimum of odor and staining.

[1] Editor's Note. Circo has a high degree of naphthenicity which is said to contribute to its efficient plasticizing action. See India Rubber World, Dec. 1, 1940, p. 58.


Reclaimed
RUBBER
REVITALIZED WITH
MICRONEX IS
Better
RECLAIM
MICRONEX
Beads or Compressed
A
COLUMBIAN
COLLOID
200 TONS
OF SMOKE
A DAY
COLUMBIAN CARBON
COMPANY
BINNEY & SMITH CO.
DISTRIBUTOR
•
COLUMBIAN CARBON CO.
MANUFACTURER

RECLAIM REINFORCEMENT

THE established principles of Micronex reinforcement of rubber apply with equal force to reclaimed stocks. For many important purposes natural rubber is virtually useless without Colloidal Carbon, and similarly compounds made with regenerated rubber need Micronex if designed for dynamic use.

By far the greatest proportion of reclaim for the rubber industry is in the form of whole tire stock. This most important type may be pictured as consisting of a mixture of tread rubber blended with carcass and cushion gums, with the tread particles maintaining their identity as discrete particles in a matrix of softer material which is deficient in reinforcing colloidal carbon.

Compounding studies on the carbon loading of whole tire reclaim demonstrate the need for reinforcement. Just as additional sulphur is required to revulcanize so, also, is additional Micronex necessary to revitalize regenerated rubber. Whether blended with new crude or used straight, the requirements for Colloidal Carbon reinforcement fall closely in line with ratios well established for use with new rubber.

Thus the reapplication of well recognized and established principles supplies the answer to one important phase of the rubber compounding problem of the present day.

•

Micronize Regenerated, As Well As New Rubber,
FOR MAXIMUM TENSILE STRENGTH
FOR MAXIMUM RESILIENT ENERGY
FOR MAXIMUM SERVICE

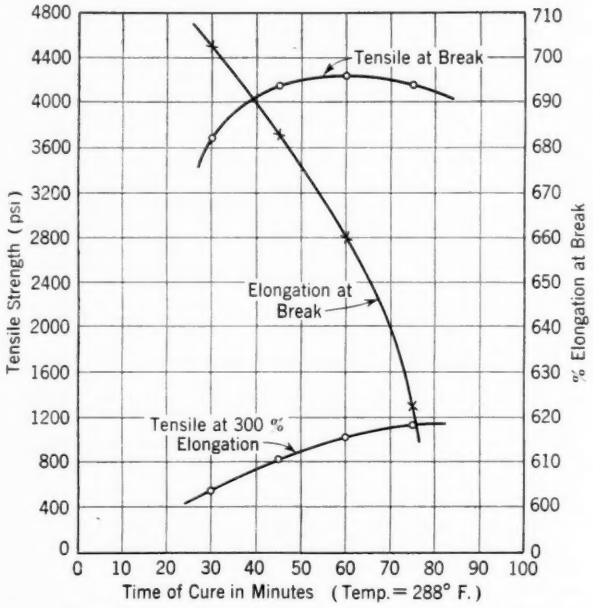
•

BINNEY & SMITH CO.
DISTRIBUTOR

COLUMBIAN CARBON CO.
MANUFACTURER

Resinous Hydrocarbon Products as Rubber Extenders

L. M. Geiger[1]



Data from V. L. Smithers, Inc., Laboratories.

Fig. 1

THE state of the rubber industry in the current emergency with government control of the distribution of latex and crude rubber by allocation and the prohibition of the sale of consumers' goods, such as automobile tires, makes only more imperative the necessity of concentrated research and development on extenders for the reduced supply of crude rubber, rubber latex, reclaimed rubber, and the various synthetic elastomers being produced. Whether or not the goods being produced are for consumption in a direct defense application or as necessities for public welfare is immaterial insofar as extension of existing rubber supplies is concerned. This brief review is intended, therefore, to bring to the attention of the rubber technologist some of the past work on rubber compounding, especially as regards the use of cyclic hydrocarbons of liquid as well as resinous nature.

Natural Rubber and Latex

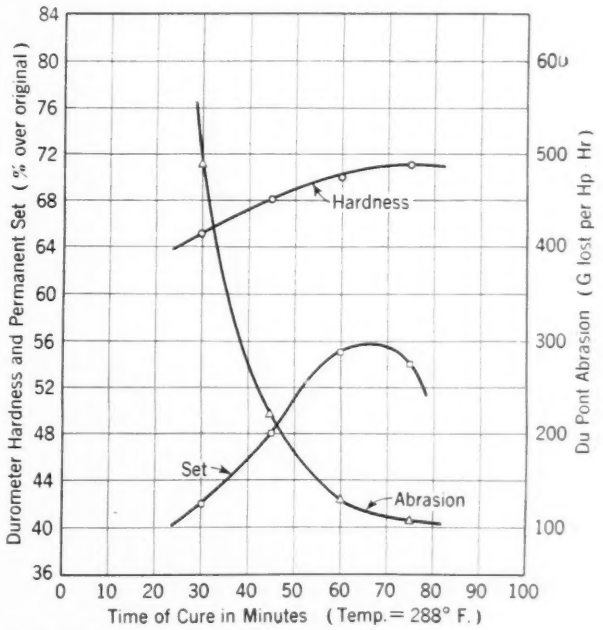
It should first of all be noted that after the addition of excessive amounts of a hard, brittle thermoplastic resin, a rubber compound does not retain its desirable properties when vulcanized, i.e., elasticity, absence of thermoplasticity, and resilience.

Certain coal-tar products have found extended use in tire carcass stock. The behavior of Nevoll, a refined coal-tar oil, has been evaluated in this respect, and Figures 1 and 2 illustrate the trend of properties to be expected in the composition given below:

Nevoll	4
Smoked Sheet	93
Carbon Black	38
Zinc Oxide	5.6
Sulphur	5
Stearic Acid	1
DPG	0.7

The addition of from 2 to 10% of coumarone resin based on the rubber aids in breaking down the rubber and imparts tack and a softening action which permits good tubing and calendering. The addition of 10 to 100% of coumarone resin tends to deaden the stock and causes it to resemble leather. As the resin content is increased, the product becomes more resinous, as indicated by a high degree of temperature susceptibility. We know of no way in which this trend can be overcome. But as a matter of fact, use of high resin content rubber compositions of only slight rubber-like nature has been made in the production of hard rubber goods, rubber floor tile, and molding compositions. The good electrical properties of coumarone resin adapt this type of composition to moldings in electrical equipment. In general, the same comments would apply to the lower melting point coumarone resins. One advantage accrues from the use of more than 10% resin (based on the rubber): the better wetting power of this type of polymer allows the compound to be loaded heavily with fillers, reenforcing agents, and pigments, and is, in effect, a means of extending rubber.

The terpene polymer, known as Nypene Resin, is somewhat more useful insofar as rubber extension is concerned. The following compositions illustrate the point and compare the two types of previously mentioned resins to a commercial (liquid type) softener in Table 1. From the examination of the properties given the cured rubber composition by the terpene polymer as in experi-



Data from V. L. Smithers, Inc., Laboratories.

Fig. 2

[1] Technical Service Laboratory, The Neville Co., Pittsburgh, Pa.

ments A and B, it should be noted that it is somewhat paradoxical that the addition of a hard resin of 145° C. M.P. would behave in this manner.

TABLE 1.

	A	B	C	D
Rubber	100	100	100	100
Terpene Polymer*	5	10	..	..
Coumarone Polymer†	..	..	8	..
Reogen	..	..	..	8
Zinc Oxide	5	5	5	5
Whiting	20	20	20	20
Captax	1	1	1	1
Sulphur	3	3	3	3
Cure: 40 minutes at 287° F.				
Modulus @ 300% Elongation	325	250	275	200
Modulus @ 500% Elongation	700	600	650	450
Tensile Strength psi	2700	2400	2950	220
Elongation	755	785	805	805
Hardness	51	47	50	49

*Nypene Resin 140-150° C. M.P.
†Coumarone Resin 127-142° C. M.P.
Data courtesy of Binney & Smith Co.

The compounding of rubber latex with resinous materials for the control of elasticity, tensile strength, and tack has long been practiced. Emulsions of the compounding ingredients must of necessity be formed first and then admixed with the latex; in which instance, any dry powders, fillers, or other water-soluble materials are incorporated with the former. Teague[2] prepared emulsions of low melting point coumarone resins in conjunction with thickening and stabilizing agents. Rosin[3] has been used both as the resinous ingredient and emulsification agent combined in preparing emulsions of coumarone resins. Fatty acids[4] and sodium silicate[5] have also been used for the same purpose. In each instance an adhesive of somewhat tacky nature is obtained on blending these emulsified coumarone resins with rubber latex. Because emulsified coumarone resins are not efficient tack-producers in rubber latex as measured by the film properties, the degree of tack is controlled by other products in the emulsion, usually oils. This point is true unless the melting point of the coumarone resin is quite low.

Recently there has appeared on the market a resinous terpene polymer,[6] emulsions of which produce a maximum amount of tack in rubber latex with a minimum of thermoplasticity and loss of elasticity. When used as an adhesive or impregnant, such a compound latex has been noted to give about the same tensile strength as a rubber latex film with a slight reduction in elongation. That it is a useful extender for rubber latex in adhesive applications is shown by the fact that maximum tack is produced at about 60 parts of rubber solids to 40 parts of resin solids, which is somewhat more resin than that required to give maximum tack with other resins. Regarding initial tack and retention of tack on aging, our laboratories have evaluated by an empirical method latex films compounded as in Table 2, using 20 parts of resin solids and 80 parts of rubber solids, except for the Nypene Resin in which 40 parts of resin solids are used to 60 parts of rubber solids.

TABLE 2.

Emulsified Resinous Product	Degree of Tack in Film: Initial	Degree of Tack in Film: One Month
Coumarone Resin 85° C. M.P.	50	30
Wood Rosin	80	20
Hydrogenated Wood Rosin	100	60
Nypene Resin	100	80

Reclaimed Rubber

The use of coumarone resin is suggested with reclaimed rubber especially if the latter is fortified with a small amount of raw rubber. Because reclaim usually contains oils from the devulcanization treatment, it is advisable to incorporate a coumarone resin of as high melting point as practical. The oils tend to soften the resin, and the latter appears to act as a fluxing agent since more rapid uniformity occurs between the two types of rubber on the mill. The resin imparts the normal softness and tack to the stock. It has been found by some laboratories that the coumarone resin tends to reduce the rate of vulcanization of the reclaimed rubber, and this tendency has been found desirable since it affords a somewhat easier method of control.

Synthetic Elastomers

Very little data have been published on the compounding and extension of rubber with any of the synthetic types. Until just recently there has been no incentive to study this system, primarily owing to the wide price difference between these two types of rubber. Considering a given synthetic elastomer *per se*, more softener is necessary when compounding it, since in general it requires a more severe milling to break down. Unless oil resistance is imperative, from 10 to 20 parts of 25° C. M.P. coumarone resin to 100 parts of elastomer may be used. This resin is a tackifying type softener; if tack is not desirable, it is advisable to use an oil, such as Nevoll, or for pale colored stocks the dicoumarone-diindene polymer oil, No. 1-D Heavy Oil is suggested. It should be mentioned, however, that since the price of synthetic elastomers is high, the normal tendency is to load them with cheaper materials, such as resinous hydrocarbons, which will act both as an extender and filler. But here again a departure from the desirable rubbery properties is experienced if caution is not used; also the purpose of using a special-type synthetic rubber for oil resistance or heat resistance would be defeated.

Extension by Other Synthetic Resins

Another approach to the rubber extension problem is the use of the high molecular weight, film-forming types of synthetic resins. Naunton and Siddle[7] have been able to incorporate thermo-setting resins into rubber latex by prior emulsification of the former. Apparently the combination of phenol-aldehyde resins of this type with rubber constitutes a current problem due to incompatibility. Similar negative results have been indicated in attempts to incorporate the cellulose ethers with rubber.

The polystyrene resins have been most successfully incorporated into rubber in any of three ways. Styrene may be emulsified and polymerized and added directly to rubber latex. The resin may be milled directly into raw rubber or it may be dissolved in an aromatic hydrocarbon solvent, such as benzol, or other solvent in which the resin and rubber are mutually soluble. Bacon and Schidrowitz[8] found that the addition of seven parts of polystyrene to 100 parts of rubber reduced the modulus of the cured batch considerably with elongation and tensile strength at break, respectively, 520% and 2775 psi. In contrast to the behavior of the polystyrene and possibly the polymethacrylates, most other synthetic resins have a marked stiffening effect on the vulcanizate.

Even today it is possible to procure quantities of crude polystyrene in various melting points obtained as a coal by-product, and it is possible that this may offer the rubber technologists a new raw material for extension of rubber.

[2] U. S. patent No. 1,719,948 (1929) to General Rubber Co.
[3] U. S. patent No. 1,007,681 (1911) to Ellis-Foster Co.
[4] U. S. patent No. 1,803,816 (1931).
[5] U. S. patent Nos. 2,051,409 and 2,051,410 (1936) to Barrett Co.
[6] Nypene Resin Emulsions (1941), Neville Co.
[7] *India-Rubber J.*, 81, 17, 535, 565 (1931).
[8] *Ibid.*, 97, 13, 387 (1939).

EDITORIALS

400,000 Tons in 1943?

JESSE JONES, Federal Loan Administrator, announced last month that synthetic rubber production was to be expanded to 400,000 tons per year in 18 months' time. Thus, by the middle of 1943 we should be producing synthetics at a rate equal to almost 30% of the total world crude rubber production in 1940, or well over 50% of our crude rubber consumption last year. In 1941 our synthetic rubber production was equivalent to less than 2% of our crude rubber consumption. It took the plantation industry of the Far East nearly a half century of painstaking effort to reach a production of 400,000 tons a year. Yet we are to do with science and mass production in 1½ years what it took the British and Dutch planters, working with nature, nearly 50 years to accomplish. The time limit set for this stupendous undertaking seems extremely short.

But with our entire Far Eastern rubber supply in jeopardy, we must look to other sources. Because synthetic rubber appears to offer the greatest possibilities in terms of speedy mass production, it is now receiving prompt attention. This is as it should be, but our optimism should be tempered by an appraisal of what such a program will entail. Presumably a major part of the expansion will be directed at the production of the general purpose synthetic, the butadiene-styrene copolymer. Thus, in the first place, we are going into the mass production of a synthetic that has been produced in this country only on a small pilot-plant scale and only for a relatively short time.

Secondly, we must erect huge plants or find suitable existing plants for producing the basic raw materials and for polymerization. To furnish these plants with the necessary processing equipment and machinery will require huge quantities of metals, now vitally needed for other war production. Building the plants and then operating them will involve the problem of an adequate supply of skilled labor. Many chemical engineers will also be needed.

Thirdly, we must be ready to face the possibility that rapid advances in chemical technology may render this half-billion dollar industrial giant obsolete in the near future, perhaps even before it is completed.

Finally, it must be remembered that present-day rubber compounding and processing have 100 years of development behind them. Although we can borrow heavily from this wealth of experience in compounding and processing the synthetic elastomers, much further work will have to be done if they are to be efficiently utilized.

In brief, to reach our objective will require all the resourcefulness of our chemical, petroleum, and rubber industries. It will require heavy sacrifices in men and material. We must not be over-optimistic; there may be discouraging setbacks and costly mistakes. We must not forget, too, that when the job is done, it will enable us to meet about only half of our important rubber needs.

Intelligent Conservation

AT LAST the country has an intelligent approach to rubber conservation. Last November this column advocated a rubber conservation program that would fix the maximum permissible rubber content of each product and that would restrict the quantity output in each line as determined in the light of the best interests of the country. We held that such a plan would have a sounder technical basis than that of the plan then in effect which arbitrarily restricted the amount of rubber consumed without regard for how it was to be used and for what purpose. Apparently the deficiencies of the original order have emphasized its inadequacy.

Effective on February 1 is Amendment No. 3 to Supplementary Order No. M-15-b (see pages 484-486). This amendment definitely stipulates just what products can be made, in what quantity, and how much rubber is to be used in their manufacture. Specifications will be issued from time to time that will control the manufacture of the listed products. Under intelligent supervision this program should produce gratifying results in terms of rubber conserved. Full advantage can be taken of all the recent advances in compounding technology—advances that mean more serviceable rubber goods with less rubber.

Under the new order, all products to be produced, including those for essential war uses, are subject to restrictions. To get the most good out of our crude rubber supplies, the specifications to be issued, in addition to stipulating the maximum rubber content, should take into consideration the intended service and provide quality provisions commensurate with this service. A tire that is to be subjected to a maximum of 5,000 miles of service should not be made durable enough for 40,000 miles of travel.

The new order places no restrictions on reclaimed rubber, but the War Production Board should make every effort to assure that rubber manufacturers receive all necessary reclaim. An adequate supply of rubber chemicals and compounding materials must also be considered in the move toward maximum conservation. These materials are all important in the saving of rubber; they must not be ignored.

Synthetic rubber will play an increasingly important role in respect to our total rubber supplies in the not too distant future. Even if the optimistic production figure of 400,000 tons is achieved, it may still be necessary to conserve our production much along lines of the present rubber program. We should start now to prepare for the conservation of this future rubber supply.

The basic machinery has been set up for a maximum production of goods from the limited amount of rubber available for processing. The amount of rubber saved in the case of individual products under the new program will depend on how well the order is administered. We hope those responsible for the direction of the program will take full advantage of the hidden rubber resources represented by over a century of development and technical advances in compounding.

What the Rubber Chemists Are Doing

S.A.E. Holds Annual Meeting

MORE than 30 technical papers were presented at the annual convention of the Society of Automotive Engineers, Inc., held at the Book-Cadillac Hotel, Detroit, Mich., January 12 to 16. A. W. Carpenter, of B. F. Goodrich Co., L. A. Danse, Cadillac Motor Car Division, of General Motors Corp., E. G. Kimmich, Goodyear Tire & Rubber Co., and W. J. McCortney, Chrysler Corp., reported on the "Progress of Standardization of Automotive Rubber Specifications and Tests." "Retreading Tires" was discussed by M. E. Nuttila, Cities Service Oil Co., at a forum on salvaging motor vehicle materials by improved methods of maintenance.

Elected as president for 1942 was A. W. Herrington, head of Marmon-Herrington Co., Inc., Indianapolis, Ind.

Society of Rheology Symposium

M. L. HUGGINS, of the Eastman Kodak Research Department, Buffalo, N. Y., will speak at 10.30 a.m., February 20, on "Theoretical Fundaments Concerning the Connection between Viscosity, Molecular Size, and Molecular Shape" as a feature of the Symposium on Viscosity, Molecular Size, and Molecule Shape sponsored by the American Society of Rheology. The all-day meeting will be held at the Brooklyn Polytechnic Institute, 85 Livingston St., Brooklyn, N. Y., and there will be a buffet lunch at 1.00 p.m. in the gymnasium. The afternoon session, meeting at 2.30 p.m., will be addressed by W. L. Lauffer, of the Rockefeller Institute for Medical Research, Princeton, N. J., speaking on "Experimental Methods and Facts." Discussion groups will meet at 11.45 a.m. and 3.45 p.m.

Quebec Group Has Bakelite Night

THE Quebec Rubber and Plastics Group held a Bakelite Night dinner-meeting January 9 at the Faculty Club, McGill University, Montreal, P. Q., Canada. J. E. Buchan, assistant factory manager of the Bakelite Corp., discussed the growth of the plastics industry and described the various types of modern plastics. He designated phenolics as the most important type. The lecture was followed by "The Fourth Kingdom," a 45-minute motion picture that illustrated the uses of plastics.

"The Manufacture and Use of Colloidal Blacks in Rubber and Plastics" is the subject of the address C. R. Haynes, of Binney & Smith Co., New York, N. Y., will give at the February 6 meeting of the Group at McGill.

Ontario Group Meets at Hamilton

THE Ontario Rubber Section, Canadian Chemical Association, held a joint meeting with the Hamilton Chemical Association on January 21 at McMaster University, Hamilton, Ont. Douglas Lorimer, Controller of Chemicals for the Dominion of Canada and president of the Canadian Chemical Association, spoke on "War Time Control of Chemical Products." He predicted a stricter control of chemicals for civilian uses in 1942 to meet increasing demands of war industries.

Chicago Group to Hear Somerville on Weather Aging

THE Chicago Group, Rubber Division, A. C. S., will meet for dinner at the Congress Hotel, Chicago, Ill., at 7 p.m. February 5. A. A. Somerville, of R. T. Vanderbilt Co., will present an illustrated lecture on "Weather Aging." The paper, which will have its first presentation at this meeting, describes in detail the effect of sunlight on rubber samples over a period of years.

A sound film, "The Eyes of the Navy", describing the aviation division of the United States fleet will be presented by Ensign W. J. Gillerlain, of the Chicago Office of the U. S. Navy.

Thomas Midgley, Jr., has been awarded the 1942 Willard Gibbs Medal of the American Chemical Society for "discoveries which are outstanding both from the standpoint of pioneering in new fields and from the standpoint of commercial importance." Dr. Midgley, discoverer of tetraethyl lead, is well known for his many other achievements and for his contributions to synthetic research.

Frederick E. Traflet

Extender for Latex Compounds

VANZAK, a product of R. T. Vanderbilt Co., Inc., 230 Park Ave., New York, N. Y., is an emulsified organic extender for latex and dispersed reclaim which is expected to find its greatest application in extending rubber in compounds designed for saturation and coating of fabrics. Vanzak is reported to mix in all proportions with latex and dispersed reclaim without greatly increasing viscosity and to produce in such compounds a film strength and binding power greater than that given by inorganic loading materials. The total solids content is 40 to 45%, and the specific gravity of the dry solids is about 1.50.

Neoprene Type CG

NEOPRENE TYPE CG (specific gravity, 1.25) is a modified form of Neoprene Type GN and is similar to it in most respects except that in the raw or unvulcanized state it is much harder and stiffer and in the vulcanized state it has better physical properties at elevated temperatures. In the unplasticized state the approximate Durometer hardness of the Neoprene Type GN rope is 30; while that of Type CG rope is 75. According to the manufacturer, E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., Neoprene Type CG is of interest for special applications because its unvulcanized films are tough and relatively strong. It is reported to be particularly well suited for adhesives which, after drying, must provide: (1) high initial bond strength; (2) a rapid rate of cure or set-up at room temperature; and (3). a very high permanent bond strength when fully cured.

Head of New York Group

Present chairman of the New York Group, Division of Rubber Chemistry, American Chemical Society, is the tall, genial, and popular Fred Traflet, vice president of the Pequanoc Rubber Co., Butler, N. J., which he had joined in 1923 as chief chemist. Promotions followed, and he became successively assistant superintendent, technical superintendent, assistant secretary, and then vice president.

Frederick E. Traflet was born in Newark, N. J., April 4, 1897. He was educated in the Yonkers grade schools, Yonkers High, and New York University, graduating in 1919 with a B.S. in chemical engineering. Then he found employment with the Habirshaw Electric Cable Co., Yonkers, N. Y., where he remained until 1923.

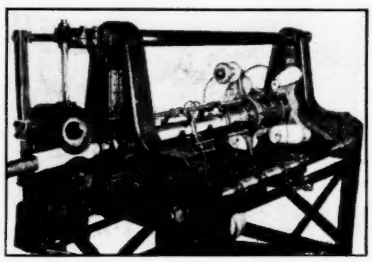
His hobbies are photography and

(*Continued on page* 524)

New Machines and Appliances

Hose Machine Knits Wire and Fabric in One Operation

A HORIZONTAL hose reenforcement machine, designed to produce tubing and hose for aircraft controls, knits, in one operation, on standard 50-foot mandrels four to six feet of wire and fabric reenforcement per minute over synthetic rubber inner tubes. The mandrels pass over rubber-covered tension feed rolls through a knitting head equipped with latch needles supplied by four cones of yarn and one or two spools of wire. The mandrel with knitted cover is then drawn out of the machine over a set of rubber covered tension wheels ready for rubber impregnation and vulcanization. Interchangeable knitting heads permit production of hose or tubes with diameters up to two inches I.D. The machine, it is claimed, can be utilized for making reenforced hose for a wide range of uses, with or without wire insertion, and a tough, flexible tube or hose with nonkinking properties results from fabric and wire reenforcement knitted in one operation. Fidelity Machine Co.



Horizontal Hose Reenforcement Machine

Selflube Porous Iron Bearings to Conserve Copper

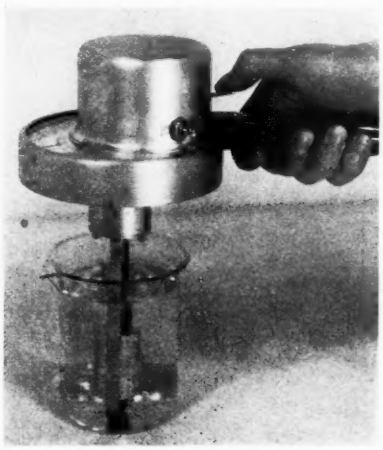
SELFLUBE iron bearings, recently introduced to conserve copper, are self-lubricating and have a porosity of 25 to 35%. They are made from powdered iron which is molded to size in the desired shape, baked, and saturated with oil. A large amount of stored oil forms a continuous protective oil film on the surface. These bearings, said to have a low friction coefficient, are supplied in standard and special shapes. Keystone Carbon Co., Inc.

Photoelectric Smoke Alarm Increases Combustion Efficiency

THE photoelectric smoke alarm Type A25C consists of a light source, photoelectric control, and an indicator. The light source, mounted on one side of the flue or stack, projects a light beam to the eye of a photoelectric control mounted on the opposite side. The control is wired to a Densometer meter, usually located in the power plant for observation by the engineer, which gives a continuous reading of the degree of density of the smoke passing through the stack. A small green light indicates efficient combustion, and a larger red one warns that smoke is excessive. Photoswitch, Inc.

Viscosimeter Has Four Speeds

A FINGER-CONTROLLED lever permits a change of speed during measuring operations without stopping the rotating spindle in the Synchro-Lectric variable speed viscosimeter. A synchronous motor and selective gear transmission afford four speeds experimentally selected to give the most useful range in the measurement of viscous solutions and to provide a method of determining the characteristics of materials of plastic flow. A 15-inch dial scale gives readings direct in centipoises. The instrument is adapted for both laboratory use and control testing in plant processing containers. It is reported that parts subject to immersion will withstand temperatures up to 600° F. The multiple speed device, it is claimed, affords a basis for determining values at different rates of sheer in testing thixotropic and dilatant materials. Brookfield Engineering Laboratories.

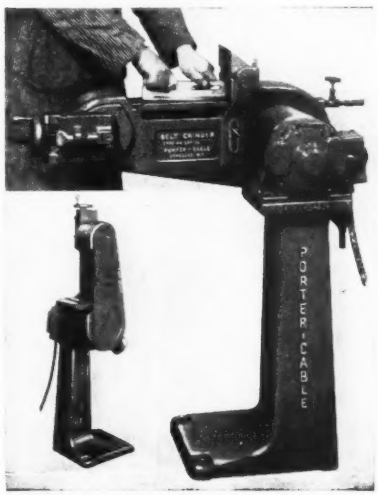


Synchro-Lectric Viscosimeter

Small Abrasive Belt Sander-Grinder

TYPE G-4 Porter-Cable belt grinder is a small, portable abrasive belt sander-grinder which employs a belt four inches wide by 45 inches in circumference. It may be used either with dry or coolant-sprayed resin-bonded belts. Driven by a ¾-h.p. ball-bearing motor directly connected to the drive pulley, the belt develops a speed of 3,400 surface feet per minute traveling over a flat backing plate which affords a working surface of 40 square inches. Two simple hand adjustments provide for alinement or removal of the belt, and the displacement of three bolts effects a position change from vertical to horizontal. The Type G-4 may be used for sanding or grinding small parts composed of hard rubber, plastics, and other materials and will, it is claimed, produce a clean, uniform surface. Porter-Cable Machine Co.

Photoswitch Smoke Alarm



Small Belt Grinder for Wet or Dry Abrasive Belts

UNITED STATES

400,000-Ton Goal for Synthetics; Further Restrictions on Rubber Use

Last month Jesse Jones announced that a $400,000,000 program was under way to establish by the middle of next year a huge synthetic rubber industry in this country with an annual capacity of 400,000 tons. (See below) Synthetic rubber order No. M-13 was amended to cover all synthetic elastomers including polyisobutylene. (See page 480)

New regulations on rubber consumption, as covered under Amendment No. 3 to Supplementary Order No. M-15-b, (see pages 484-86) sets production quotas on a detailed list of permissible products which must be produced under specifications set by the newly created War Production Board that supersedes the Office of Production Management. Regulations governing reclaim consumption are reported to be under study.

The Office of the Quartermaster General announces a program to conserve rubber in the Army. (See page 496)

Five amendments to Supplementary Order No. M-15-c on tire rationing were issued last month. (See pages 483, 497) An order rationing retread tires is expected early this month. Price ceilings were set for retreaded tires, and it is reported that ceilings would also be set soon on second-hand tires. (See page 495)

Last month the Senate passed a bill authorizing planting of 75,000 acres in the Western Hemisphere to guayule and other rubber bearing plants. The bill was approved on January 26 by the House Agricultural Committee. (See page 498)

As we go to press, the setting of price ceilings on scrap rubber is expected.

400,000-Ton Synthetic Capacity Scheduled for Mid-1943

Jesse Jones, Federal Loan Administrator, on January 12 in Washington, D. C., announced that, with the approval of the President, the RFC is authorizing the construction of facilities for the manufacture of synthetic rubber to an annual capacity of 400,000 tons, including contracts heretofore let. We are assured by the industry that raw materials are available sufficient to manufacture synthetic rubber to any reasonable extent, and if it develops that more is needed, the capacity will be provided.

The estimated cost of the new facilities necessary for the manufacture of the raw materials, together with processing plants, is approximately $400,000,000. The industry will be permitted to furnish any part of the capital that it wishes to. However the RFC will furnish it all if necessary.

The production of synthetic rubber in the United States will be approximately 90,000 tons before the year ends. The additional facilities will be built as rapidly as possible and should be in production by the middle of next year.

The companies which will undertake the program include most of the major rubber and oil companies who are already working in this field. The technical and scientific skill of several of the companies, as well as existing patents, have been pooled to insure maximum efficiency and production.

Rubber Reserve Co. and the trade, including the barter rubber, have on hand and afloat more than 600,000 tons of raw rubber, and there is in excess of 1,000,000 tons of used rubber available, which can be reclaimed and reworked to produce at least 600,000 tons of usable rubber. Reclaiming on a decreasing scale will provide some rubber annually over a period of years. Retreading will make tires last longer.

With care and prudence in the use of rubber for all purposes, our supply can be made to meet absolutely vital needs until the synthetic program is in production. For the time being, however, there must be a greatly curtailed use and a very strict conservation of rubber by the government and by every individual user.

Mr. Jones estimates that the synthetic rubber produced on large-scale production will cost about 30¢ a pound.

Mr. Jones amplified his original statement with the estimate that the four defense plants on the synthetic program—Firestone, Goodyear, Goodrich, and U. S. Rubber—would produce about 60,000 tons by the end of this year, which, added to the 35,000 to 40,000 tons private plants would produce, would bring total production to about 95,000 to 100,000 tons for 1942.

Names of other companies participating in the program, Mr. Jones said, would be withheld until it has been determined which will operate defense plants and which will finance their own operations. But when asked about specific companies, he replied that Shell, Phillips, Texas, and Standard were in the program and that Gulf Oil may come in. Besides the four above mentioned rubber companies, he added that General Tire is considering participation. Du Pont and Dow Chemical were mentioned as participants from the chemical industry.

RFC officials do not foresee any great labor dislocations or labor procurement problems for the synthetic program. Gradual conversion of employment from the natural rubber industry to the synthetic program is expected as a result of curtailment of materials and processing in the crude rubber fabricating plants.

Weidlein Discusses Plan

Pooling of patents, resources, experience, and technical skills by the rubber, chemical, and petroleum industries should make possible successful attainment of the nation's 400,000-ton synthetic rubber program, E. R. Weidlein, chief, Chemicals Branch, OPM, declared January 14. Many technical difficulties have been avoided by the pooling of patents and technical information. Dr. Weidlein said. The best example of this is the fact that the production program agreed upon and now under way will avoid the use of chlorine. Chlorine is widely used in war production and present demands are more than supply.

Enough raw materials are now in sight for half the proposed program. They will be provided largely by the chemical industry. Basic ingredients for the Buna S type of synthetic rubber adopted as a standard are butadiene and styrene. Butadiene is produced from petroleum, natural gas, alcohol, or acetylene. Styrene is a by-product of the coke industry, coming from benzol. Some twenty other chemicals are needed for the production of synthetic rubber, but the quantities to be used are small and present no large production problems.

If high priority ratings are assigned for the necessary quantities of non-corrosive steel for equipment, the first 200,000 tons of synthetic rubber will be in production by January 1, 1943, according to Dr. Weidlein.

The problem of raw materials for the next 200,000 tons has been discussed with the petroleum industry, which is

CALENDAR

Feb. 3.	Los Angeles Rubber Group.
Feb. 4-6.	American Management Association Annual Personnel Conference. Hotel Stevens, Chicago, Ill.
Feb. 5.	Chicago Rubber Group, Congress Hotel.
Feb. 6.	Quebec Rubber & Plastics Group. McGill University, Montreal.
Mar. 2-5.	A.S.T.M. Committee Week and Spring Meeting. Cleveland, O.
Mar. 6.	Nichols Medal Award. New York, N. Y.
Mar. 23-25.	A.S.M.E. Spring Meeting. Houston, Tex.
Apr. 14-17.	1942 Packaging Exposition and Conference. Hotel Astor, New York, N. Y.
Apr. 20-24.	A. C. S. 103rd Meeting. Memphis, Tenn.
May 25-28.	National Association of Purchasing Agents, 27th Annual Convention and Inform-a-Show. Hotel Waldorf-Astoria, New York, N. Y.

studying the matter. The necessary butadiene can be produced as a by-product in the 100-octane gasoline plants now being constructed to provide aviation gasoline. The butadiene can be extracted, Dr. Weidlein said, without cutting down the amount of aviation gasoline produced and without restricting the output of other petroleum products.

If this production is in sight by July of this year, the second 200,000 tons of synthetic rubber can be ready to go into production by mid-1943, he said.

Continued experimentation will go on during production, and it is expected improvements in synthetic rubber will be made from time to time. Present outlook is for a product that is 95% as efficient as crude rubber for automobile tires and superior to crude for some other uses.

Some variations in formula will be made in various plants as experiments go forward. Certain types apparently are superior for inner tubes, for instance, and these variations will be made.

The entire program is expected to result in the construction of about twenty new plants, both for raw materials and finished products. Four synthetic rubber plants now are under construction, and two more will be started within a few weeks. Three or possibly four more will be necessary for the entire 400,000 tons of synthetic rubber.

Warning By Henderson

Price Administrator Leon Henderson on January 15 declared that relaxation of tire rationing at present because of the expansion of synthetic rubber production would be "dangerous and foolhardy." At least 18 months, if not more, will be required before any substantial amount of synthetic rubber becomes available. Besides reports from the Far East indicate that rubber trees and processing plants are being destroyed to keep them from aiding the enemy. Consequently it is quite possible, Mr. Henderson contends, that every pound of the synthetic that can be produced may be needed for direct military use. Others who will need tires before the general public must also be considered, that is, all of the services essential to the health and safety of the public. Thus tire rationing must be continued.

Crude Rubber and Latex No Longer Available for Many Civilian Goods

Amendment No. 3 to Supplementary Order No. M-15-b to Restrict the Use of Rubber (see pages 484-86) provides more rigid control of the use of crude rubber and latex and thus cuts the amount of these materials available this year for the wide variety of civilian goods by about 75% under recent annual consumption. Such products as bathing suits and caps, erasers, toys and novelties, lawn and garden hose, trouser belts, combs, golf and tennis balls and other sporting goods, heels for ordinary footwear, household aprons, sponge rubber goods, and other products of non-essential character can be made in the future only from reclaimed rubber. In restricting processors to only the most essential products, the War Production Board held that hides, fabrics, wood, and other less scarce materials may be substituted for rubber in a wide variety of products usually made by the 620 firms in the industry.

The new amendment lists the uses for which rubber and latex will be made available to processors. Except for strictly-war orders these uses are restricted each month beginning February 1 to certain percentages of average monthly consumption during the year ended March 31, 1941. Thus the percentage for miscellaneous rubber goods is 25, and it is expected that this will be enough to cover all orders having high preference ratings, but will not allow production of non-essentials. Also, for certain products specific permission of the WPB must be obtained to use any rubber.

Manufacture of all products permitted must conform with specifications set from time to time by the WPB. This point means that the Board, after technical studies, may order reductions in the weight of crude rubber used in any permissible product, thus furthering conservation efforts. Until these specifications are drafted, the rubber and latex content of any product cannot be increased.

Another point in the amendment is that until further notice no one may sell, trade, or transfer any crude rubber or latex, including compounded liquid latex, without permission of the WPB or the Rubber Reserve Co.—in order to strengthen the government's control over crude rubber and latex stocks not held by the Rubber Reserve Co.

The clamor from women against the omission of girdles from the list of permissibles was so great that the WPB hastened to add that it was practically an oversight and that the subject was "still under discussion." It was further declared that steps would soon be taken to make available to manufacturers in limited quantities the rubber thread necessary for the manufacture of foundation garments. This was being done to quell fears of a shortage and to halt overbuying. Manufacturers, incidentally, have promised to effect substantial savings in the use of crude rubber by changes in design and partial substitution of other materials.

The Rubber Manufacturers Association, Inc., 444 Madison Ave., New York, N. Y., reports that shipments of automotive pneumatic casings during December, 1941, were 36% under the November figure and 48% below that of December, 1940. (See page 522)

OPA Ruling on Tires, Etc.

Price Schedule No. 63, issued December 31, 1941, by the Office of Price Administration, lists maximum prices which may be charged at retail for new tires and tubes, exclusive of the federal excise tax. While Price Schedule No. 66, issued January 10, 1942, covers retreaded and recapped rubber tires, the retreading and recapping of tires, and basic tire carcasses. Soon thereafter Administrator Leon Henderson said profiteering in second-hand tires had become serious, and the government could not let it continue; consequently price ceilings on such tires are in the offing. Also, price increases in original equipment tires for farm machinery, set the first of the year by four leading manufacturers, were voluntarily withdrawn January 14 at the request of Mr. Henderson.

Ceiling prices for the three grades of camelback that the OPM has ruled may only be manufactured hereafter were set January 19 when the Price Administrator issued telegrams asking producers not to charge more than 28¢ a pound for camelback containing 57½ to 62¼% crude rubber; 23¢ a pound for the grade containing 38 to 48% rubber; and 18¢ for that with not more than 20% rubber. These maximum prices corresponded to prevailing market levels for equivalent grades.

Facilities of new car dealers will be used to store an estimated 130,000 new passenger automobiles under a "stockpile" plan announced January 15 by the OPA covering those cars shipped by manufacturers after that date in fulfillment of the January production quota and allowing for automobile manufacturing plants to be changed over to the mass production of armament. These cars, which will probably not be released for sale for at least a year, are scheduled to be rationed to persons certified as "eligible" by the rationing authorities. Conditions regarding the "stockpile" program include the following one: "The dealer will make available to OPA at any time the tires and tubes on the stored car, 'provided that the dealer will be compensated to the extent of the wholesale price.'"

Mr. Henderson later explained that unnecessary removal by the government of tires from such stored cars would be highly undesirable and is not contemplated. Removal is reserved for cases of extreme emergency or to provide against serious deterioration of tires. In such cases suitable replacements will be provided before or when the car is released for sale.

Jesse Jones, Federal Loan Administrator, on January 23 announced that officials of the Reconstruction Finance Corp. and the OPA are meeting with representatives of manufacturers of passenger automobile tires and tubes and mass distributers thereof, to evolve a plan whereby the RFC would finance the orderly carrying and marketing of passenger automobile tires and tubes under the OPA rationing program.

Complete details will be worked out soon and then made public.

Manufacturers of rubber soles and heels, who undoubtedly will be forced to revise their lines in view of the new restrictions on crude rubber processing, were asked January 26 by letter from the OPA Administrator, not to make any sales of these new items without consulting OPA or receiving notice to proceed from that office, in order to forestall any possible chaotic price condition resulting from changes in production.

Additional Tire Rationing Boards

Mr. Henderson recently announced the formation of additional local tire rationing boards. Members of the group working in the central and western states follow, and those for the remainder of the nation are expected shortly.

Harry Camp, OPA regional director in San Francisco, directing organization of the boards in California, Oregon, Washington, Idaho, Nevada, and Arizona.

O. W. Campbell, associate regional coordinator, Division of Defense Housing Coordination, in charge of Utah, Montana, and Wyoming.

C. I. Long, assistant to the Minnesota State defense coordinator, in charge of Minnesota, North Dakota, South Dakota, and Iowa.

A. C. Tilley, of the Division of Defense Health and Welfare Services, Denver, in charge of Nebraska, Kansas, and Colorado.

John C. Weigel, OPA regional director in Chicago, is handling Wisconsin, Illinois, Indiana, and Missouri.

George Bogert, professor of law, University of Chicago, and legal consultant to council of state government, working in Texas, Oklahoma, and New Mexico.

United States Department of Agriculture, Washington, D. C., in an annual report to the Secretary of Agriculture revealed that peace-time research was proving its worth during wartime. Cited was the work of the Bureau of Plant Industry in developing extra-long staple cotton. Sea Island cotton, which has the longest and strongest fibers of any type, has been used for balloons and parachute cloth, dirigible gas cells, and airplane wing coverings. New strains of Sea Island coming into production this year have even longer and stronger fiber. The SxP variety of American-Egyptian cotton developed by the Bureau now in large-scale production in the Southwest, is going into balloon cloth and inflatable pontoons for seaplanes. Work on the Latin American rubber program also has made great strides. About 10 million *Hevea* seeds have been planted in a dozen Central and South American countries, and the control of diseases and improving yields are being closely studied. The growth of guayule and similar plants in the United States likewise is being investigated.

Army Rubber Saving Campaign Organized

The war, by cutting off normal supplies of crude rubber, confronts the Quartermaster Corps, the largest user of rubber in the country, with a very difficult problem, according to information just received. To provide tires and tubes for all Army motor vehicles and to supply raincoats, boots, and other articles utilizing rubber, the Quartermaster Corps will use more than one half of all the crude rubber requirements for the Victory Program.

Four definite steps have been taken to make existing rubber supplies go as far as possible: 1. The number of tires for Army trucks is to be reduced to a minimum. 2. A uniform type of tread is being developed for use on armored vehicles procured by the Ordnance Department as well as Quartermaster Corps motor trucks, to permit easy replacement at any point in the field. 3. Retreading, recapping, and sectional repair work is to be operated on a constantly widening scale to get the fullest possible service from Army tires. 4. To some extent reclaimed rubber will be substituted for crude in making Army tires.

Since all future motor vehicles to be produced will be for the Victory Program, no great difficulty is anticipated in standardizing the size of wheels so that the number of tire sizes for all needs can be substantially reduced.

In recapping, retreading, and making sectional repairs on tires, the Quartermaster Corps is establishing 10 base shops to recap about 1,250,000 tires per year and to make sectional repairs on some 600,000 more. In the sectional repair work, to care for small cuts and bruises to a tire before they become serious, it is estimated that use of 20 tons of crude rubber annually for this purpose will save about 75,000 tons of crude rubber which would have been needed otherwise.

Only 15 to 20% of reclaimed rubber can be used safely as a substitute for crude in making tires, but this relatively small saving ratio applied to the total War Department requirements will result in a substantial addition to the amount of crude rubber made available for other purposes.

To make sure that the best possible care and attention are given tires on all Army vehicles operated or serviced by the Quartermaster Corps, the Quartermaster General has issued 19 detailed points to his officers and men about the steps to be taken.

The Office of the Quartermaster General recently announced that the Army had found substitutes for over 800 items using critical and strategic materials (including rubber). Recently the use of rubber foot tubs which were installed in shower baths throughout the service were discontinued in favor of those to be made of other material.

Retreading Specifications to Be Revised

The Office of the Quartermaster General reports that the proposed repair and retreading program for Army motor vehicle tires has been suspended awaiting further recommendations from the OPM Rubber Industry Committee studying the matter. Revision of the original specifications is held necessary because of the tightening of rubber supplies, and the new specifications will reduce the amount of rubber used in Army retreaded tires. The original amount of rubber specified in the camelback was 60%. Tread depth will also be changed.

Under the original specifications the Army awarded contracts to the following primary contractors: In Zone 1, Auto Tire Co., Hartford, Conn.; Zone 2, Modern Retreaders, Inc., Nashville, Tenn.; Zone 3, Firestone Tire & Rubber Co., Akron, O.; Zone 4, Strauss-Frank, Houston, Tex.; Zone 5, Shaw & Phillips, Los Angeles, Calif.

Army Retreading School

The War Department, Washington, D. C., last month reported the opening of a school, in a rubber plant in Akron, O., to train enlisted men in recapping, retreading, and repairing tires. The establishment of the school, under supervision of the Quartermaster Corps, is in line with the recently announced Army plan to conserve about 50% of the rubber used in Army trucks and automobiles.

Adopts Rubber Half Sole Shoe

The Army is taking delivery during March and April on 4,000,000 pairs of shoes, 2,500,000 to 3,000,000 pairs of which will have what the Office of the Quartermaster General describes as rubber "taps," a rubber half sole over a thin leather undersole. Beginning in May the Army will purchase 2,500,000 to 3,000,000 pairs of shoes monthly, about two-thirds with the rubber "taps."

This new sole replaces the full rubber-sole shoe of which the Army purchased 2,500,000 pairs since the Spring of 1941.

The rubber tap sole was adopted because it gives longer wear, costs less, and causes less foot discomfort and was placed on the procurement list after undergoing a thorough test in last summer's maneuvers. Unofficially, Army sources say the new sole costs one half what leather costs and doubles the life of the shoe. Under field conditions Army shoes wear out in from 10 to 30 days.

The rubber "tap" sole has been used for some time in quantity for half-soling purposes.

New Rubber Bill Introduced

Bill H.R. 6453 to provide for the harvesting of chrysothamus, commonly known as rabbit brush, to make available a source of crude rubber for emergency and defense uses, has been introduced in the House by Representative James G. Scrugham, of Nevada. It was referred to the Committee on Agriculture.

OPM Amends Tire Rationing Order

Last month the Office of Price Administration issued five amendments to Supplementary Order No. M-15-c to Restrict Transactions in New Rubber Tires, Casings and Tubes (see pages 481-83). Amendments 1 and 2 appear in full on page 483. Amendments 3, 4, and 5, to be published later, are summarized here. Amendment No. 3 reads that sale of new rubber tires, casings, or tubes to foreign governments under the terms of the Lend-Lease Act can be made only under quotas, allocations, or other restrictions set by the OPM. Also, sales to foreign governments not covered by Lend-Lease Act provisions and private export sales can be made only with the express permission of OPM. Furthermore sales to the Army, Navy, and various other designated government agencies do not include sales to individual Army and Navy officers or employes of these agencies for their private cars. Neither does the exemption apply to post exchanges and similar organizations except for government vehicles operated by them. Exemptions previously granted any person with an A-3 or higher preference rating issued on a PD-3 certificate are removed, and any such persons must now apply for a purchase certificate through a local rationing board for tires for vehicles on the eligible list.

Amendment No. 4 covers two points. Eligible users of light truck-size tires now can buy any ply of tire, four, six, or eight, instead of only four as heretofore, if they can prove to the rationing board that a four-ply tire is unsatisfactory. The amendment also applies full rationing restrictions on truck tires for vehicles ten years old or more. Sales are now limited to eligible users only as against moderate restrictions requiring a user to prove his need of a new tire, to use it only to replace a worn-out one, and to turn in his old casing to the dealer making the sale.

The fifth amendment states that those tire dealers, distributers, and wholesalers overstocked with new tires and tubes or those who wish to liquidate their inventories completely, may do so. The order also now permits dealers, distributers, and wholesalers to replenish their stocks of new tires and tubes by presenting certificates and receipts obtained from sales of new tires and tubes to eligibles.

Polyvinyl Chloride Order Extended

General Preference Order No. M-10, the polyvinyl chloride order, was extended on December 31 with Amendment No. 1 to continue in effect until revoked by the Director of Priorities. Polyvinyl chloride means polymerized vinyl chloride and its copolymer with vinyl acetate, containing 92% or more of vinyl chloride, whether plasticized or unplasticized, and includes Koroseal and Vinylite. Starting January 1, 1942, no polyvinyl chloride may be delivered except as expressly directed by the Director of Priorities, and persons are warned against accepting deliveries in violation of this order. At the beginning of each month the Director will issue to each producer specific directions covering deliveries for that month. Thus defense requirements will be taken care of, and an adequate supply made available for essential civilian uses.

Toluene Allocated

Effective February 1, all toluene in this country (stocks and production) is subject to allocation, under Amendment No. 1 to General Preference Order M-34. In addition at least 70% of the total production of all producers of toluene must be of nitration grade, meeting the requirements of Grade A in United States Army specifications. The order, as amended, provides the following ratings for civilian uses of toluene:

Use	Preference Rating
Medicinals and drugs	B-1
Petroleum additives	B-2
Dyes and intermediates	B-3
Rubber accelerators	B-4
Miscellaneous organic chemicals	B-5
Solvents	B-6

Although toluene is a good solvent for rubber, its use in rubber cements is limited today with the increasing use of petroleum fractions for this purpose. The order will have little effect on the production of rubber accelerators, the bulk of which is produced from aniline, derived from benzene.

The American Petroleum Institute reports that present productive capacity of 100,000,000 gallons of toluene annually is 70% from petroleum.

"Victory Model" Bicycle

OPM officials on January 14 inspected a new line of "Victory Model" bicycles designed to meet adult civilian requirements during the war. The bicycle industry plans to make about 750,000 of these wheels this year for men and women. The 12 manufacturers, in accordance with an OPM request, have adopted one standard model, which uses no copper, nickel, or plated work and no rubber except for the tires, which are smaller and of about 90% reclaimed rubber. The maximum weight of the bicycle is 34 pounds.

Miscellaneous Notes

Assignment and extension of individual preference ratings has been simplified and made more uniform by Priorities Regulation No. 3, issued January 12.

OPM and OPA officials on January 5 denied rumors that batteries soon would be rationed.

General Preference Order No. M-66, the priority order on cashew nut shell oil, released January 13, drastically cuts deliveries and use of this oil. Forbidden is its use except for the following purposes: 1. brake linings; 2. molding resins for insulating aviation ignitions; 3. resin solutions for impregnating electrical coils; 4. such other products as may be specifically designated by the Director of Priorities. Even for these purposes the product may not be delivered or used except in filling defense orders with a preference rating of A-2 or better.

Supplementary General Limitation Order L-3-d issued by the OPM December 31, prohibits equipping new light motor trucks with any spare or extra tires. The order also formalized new December and January light truck production quotas.

Members of the rubber industry, whose total production has been curtailed about 53% because of the war, have conferred individually with OPM officials to offset reduced civilian output by more war work. About 37½% of the industry's production last month was military in character, with the remainder largely truck tires for vital transportation. Military output was scheduled to rise in January to reach 50% of the industry's total in June. Many small companies are converting to making gas masks, and the Office of Civilian Defense is seeking funds for 50 million masks for civilians in coastal areas.

A broad program to make available materials for farm equipment to carry out the Department of Agriculture's 1942 food program recently was announced by the Director of Priorities. Included in the list of critical materials needed for the farm equipment program from November 1, 1941, to October 31, 1942, is rubber, with tonnage requirements as follows: domestic new machines, added items and reserve, 14,205; domestic repair parts, 6,910; export new machines and repairs, 2,275; total, 23,390.

Cyrus Ching, director of industrial and public relations, United States Rubber Co., New York, N. Y., last month was named chairman by the OPM of the new "assisting" committee to study the automobile industry conversion problem.

Senate Asked to Investigate Rubber Supplies Situation

A special Senate committee to investigate the rubber supplies situation is proposed by Senator Sheridan Downey, of California, in a resolution (S. Res. 219) introduced January 16. The following points of inquiry would be undertaken: (1) the supply of rubber available for the needs of the national defense, (2) the supply of rubber available for general civilian needs, (3) the extent to which rubber or substitutes therefor can be produced in the Continental United States for each of such purposes, (4) the necessity of formulating a permanent national policy with respect to the domestic production of rubber or substitutes therefor, and (5) such other matters relating to the production and distribution of rubber and substitutes therefor as the committee deems appropriate.

The committee would consist of five Senators who would report the result of their studies, together with their recommendations, as soon as possible.

EASTERN AND SOUTHERN

WPB Created

On January 16, President Roosevelt established within the Office for Emergency Management a War Production Board with a chairman to exercise powers of "final" decision in general direction over the war procurement and production program. Donald Nelson, director of priorities, Office of Production Management, was named chairman, and he soon thereafter abolished the OPM, although in the main its principles and personnel were taken over by the new board. Under the order creating the WPB the Supply Priorities and Allocations Board also was abolished, and its personnel, records, and property were transferred to the WPB.

The WPB on January 20 issued a priorities order (Supplementary General Limitation Order L-2-g) stopping production of passenger cars and light trucks, beginning February 1.

Newhall Succeeds Helburn

Arthur Newhall, a director of The B. F. Goodrich Co. and vice president of Talon Corp., was named Chief of the Rubber and Rubber Products Branch on January 29, succeeding Willard Helburn, resigned.

Rubber Industry under the WPB

The Rubber and Rubber Products Branch, formerly a part of the OPM, is now a unit of the Division of Industry Operations set up by Donald Nelson under the War Production Board. J. S. Knowlson is chief of the Division, with Philip Reid, as deputy, who will direct the work of the industry branches. The function of this new division will be to convert quickly as much of each industry as possible to war production, and the Division will be given the authority to select those companies within an industry which will make essential civilian goods and which will go on war production.

Industry branch chiefs will be given much greater powers than they had under OPM, with this authority in proportion to the problems before the branch chief. Where necessary, Mr. Nelson said, they would "have the same power as I have."

The new Requirements Committee of the WPB, under William L. Batt, will ascertain what the war program will need in materials and will include members from the Economic Warfare Board, Lend-Lease Administration, Civilian Supply Division, Maritime Commission, and Army and Navy. Explaining this committee, Mr. Nelson stated:

"We have, for instance, so much rubber for 1942. There are a number of claimants for this supply. We can't take it all away from the civilian economy. The requirements committee will allocate so much for the Army and Navy, our civilians, the essential civilian economy of England."

Existing industry advisory committees will be unaffected by the reorganization and will be more closely consulted than formerly. Labor committees will also have greater participation.

Michael Caputo

Franck C. Magloire

Haiti Rubber Project to Yield 30,000 Tons Yearly

According to Franck C. Magloire, chief of the Division of Agriculture, of Haiti, vast rubber plantations which have been set out in Haiti will eventually employ 50,000 workers and yield 30,000 tons of *Hevea* rubber annually. The plantations, under the management of a private company, Société Haitizne-Américaine de Développement Agricole, with a capitalization of $5,000,000, are expected to be in production by 1947. Low labor costs of 50¢ a day were mentioned as an aid to low-cost rubber. The plantings, which utilized seed of disease-resistant and high-yielding strain, are centered in the Cap Haitian and Jeremie districts of the island. Mr. Magloire, who is in this country for a four-month visit, cited the efforts of Elie Lescot, Haiti's president, in furthering the project, and the cooperation between the Haitian Government and the United States Department of Agriculture.

New Guayule Legislation Calls for 75,000 Acres

A bill (H. R. 6299) to provide for the planting of 75,000 acres of guayule or other rubber-bearing plants "in order to make available a domestic source of crude rubber for emergency and defense uses" was introduced in the House on January 5 by Representative John Z. Anderson, of California. The bill was referred to the Committee on Agriculture, which approved the measure on January 26.

Before passage by the Senate on January 15 the title of a similar bill (Senate 2152) was amended to read "A bill to provide for the planting of guayule and other rubber-bearing plants in order to make available a source of crude rubber for emergency and defense uses."

New York Defense Course

A free evening course in Organic Constructional Materials (Rubber and Plastics) under the federal government's Engineering, Science and Management Defense Training Program began January 19 at the School of Technology, College of the City of New York, Amsterdam Ave. and 140th St., New York, N. Y. The class meets in two three-hour weekly sessions and is open to persons holding a college degree or the equivalent practical experience in chemistry or chemical engineering. The instructors are A. X. Schmidt, and Prof. Charles A. Marlies. Certificates acceptable to the United States Civil Service Commission as proof of training will be issued to all who complete the course.

U. S. Rubber Executive Appointments

F. B. Davis, Jr., president and chairman of United States Rubber Co., 1230 Sixth Ave., New York, N. Y., after the directors' regular monthly meeting on January 9 announced the following organization changes and appointments designed to speed up the company's defense efforts. Three vice presidents received important new assignments: Herbert E. Smith became vice chairman of the executive committee; Harry E. Humphreys, Jr., chairman of the finance committee and a member of the War Products Committee; and Thomas J. Needham, chairman of the War Products Committee. Mr. Needham, as head of the War Products Committee, succeeds Vice President Lucius D. Tompkins, called to Washington as special assistant to William S. Knudsen, Director General, Office of Production Management. Also on the War Products Committee are Vice Presidents Herbert E. Smith and Elmer Roberts.

The Board besides made Frank J. McGrath an assistant treasurer and William M. Dougherty an assistant secretary of the company.

Roebling Changes

John A. Roebling's Sons Co., Trenton, N. J., according to E. C. Low, general manager of sales, has named J. Nelson Hicks manager of the Boston branch to succeed P. H. Vose.

F. J. Maple, manager of the Roebling advertising department, later announced the following changes in executive personnel. E. G. Hartmann, product sales manager of the wire and specialties division, has been appointed assistant to the general manager of sales; while J. L. Unsworth has been made manager of the Philadelphia branch. W. C. Shattuck has been transferred from the New York branch to the main office at Trenton, succeeding Mr. Hartmann.

Binney & Smith Co., 41 E. 42nd St., New York, N. Y., has transferred F. A. Bonstedt, for many years a special representative at its Akron office, to company headquarters in New York. Mr. Bonstedt, however, plans to visit the trade as heretofore.

Luzerne Rubber Co., Trenton, N. J., is running full-handed on priority orders. Sales Manager Harry E. Case has been elected president of the Trenton Chamber of Commerce, of which he formerly had been vice president.

Franklin Rubber Corp., Allegheny Ave. and Boudinot St., Philadelphia, Pa., according to President M. Durst, at a recent board meeting elected as vice president Edgar B. Snyder, who has been plant superintendent and will continue in active charge of rubber production.

Raybestos-Manhattan, Inc., Passaic, N. J., according to President Sumner Simpson, has named as vice president of the organization F. L. Curtis, general manager of The Manhattan Rubber Mfg. Division, who has been with the company since its inception in 1893. Mr. Curtis will continue also as treasurer of Raybestos-Manhattan, but is succeeded as general manager at Manhattan by H. E. Smith, assistant general manager. Named to Mr. Smith's former post is J. H. Matthews, previously assistant factory manager.

Later in the month Mr. Smith announced four new promotions. W. L. White, director of laboratories, and H. Snyder, manager of the roll covering and tank lining departments, are now assistant factory managers. Mr. Snyder has been succeeded in his former post by H. H. Burrows; while P. A. Cady has been made laboratory manager.

American Hard Rubber Co., 11 Mercer St., New York, N. Y., at a special meeting of the stockholders on December 26 approved the consolidation with the Pequanoc Rubber Co., Butler, N. J., in which it owned a substantial share of stock, and the plan of reorganization. All 2,700 shares of individually owned Pequanoc common also participated in the plan. Arrangements are being made for the issuance of new certificates for both common and preferred stock and an exchange of outstanding stock certificates. Thus American Hard Rubber now controls Pequanoc as a wholly owned affiliate, but the reclaiming company will continue with the same policies and personnel as heretofore.

Brake Lining Manufacturers' Association, Inc., 370 Lexington Ave., New York, N. Y., has appointed as general manager Peter E. Chance, formerly with General Motors Corp.

A. Boyd Cornell, treasurer and general manager of the Hamilton Rubber Mfg. Co., Trenton, N. J., reported that 95% of the employes had purchased nearly $20,000 in defense bonds and stamps.

Blank & Stoller

John P. Coe

Coe Heads Reclaimers

The Rubber Reclaimers Association, Inc., 537 E. 88th St., New York, N. Y., held its annual meeting January 8 at which the following directors were named for one year: Allyn I. Brandt, vice president, Philadelphia Rubber Works Co., Akron, O.; John P. Coe, general manager, Naugatuck Chemical Division, United States Rubber Co., 1230 Sixth Ave., New York; V. H. Dingmon, president, Xylos Rubber Co., Akron; H. S. Royce, general purchasing agent, Boston Woven Hose & Rubber Co., Cambridge, Mass.; and Fred. E. Traflet, vice president, Pequanoc Rubber Co., Butler, N. J. The board then re-elected the following officers for one-year terms: president, Mr. Coe; vice president, E. H. Brooks, director of purchases, Goodyear Tire & Rubber Co., Akron; and secretary-treasurer, M. B. Miller.

Greetings, Calendars, and Souvenirs

The staff of INDIA RUBBER WORLD gratefully acknowledges the following holiday mementos:

Wallets from H. Muehlstein & Co., Inc., New York, N. Y., and Pequanoc Rubber Co., Butler, N. J.

Loose-leaf notebook from Dispersions Process, Inc., New York.

Pocket memorandum books from General Atlas Carbon Co., New York, and Pittsburgh Plate Glass Co., Pittsburgh, Pa., and John Royle & Sons, Paterson, N. J.

Mechanical pencil and 1942 pocket diary from Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

Six boxes of assorted balloons, Lee-Tex Rubber Products Corp., Chicago, Ill.

Useful calendars from Advanx Tyre & Rubber Co. Pty. Ltd., Sydney, Australia; Bridgewater Machine Co., Akron, O.; Brown Instrument Co., Philadelphia, Pa.; Godfrey L. Cabot, Inc., Boston, Mass.; General Electric Co., Schenectady, N. Y.; Hercules Powder Co., Wilmington Del.; Imperial Paper Color Corp., Glens Falls, N. Y.; National Rubber Machinery Co., Akron; The Oak Rubber Co., Ravenna, O.; Simplex Wire & Cable Co., Cambridge, Mass.; United States Rubber Co., New York, and C. K. Williams & Co., Easton, Pa.

Attractive greetings from Carl A. Bartle, of E. I. du Pont de Nemours & Co., Inc., Wilmington; Eric Bonwitt, Akron; Cochrane Corp., Philadelphia; A. R. Davis, of American Cyanamid & Chemical Corp., Stamford, Conn.; Dr. Hugo Fuchs, New York; Thos. L. Gatke, Gatke Corp., Chicago, Ill.; General Latex & Chemical Corp., Cambridge; I. D. Hagar, of Titanium Pigment Corp., New York; Guy L. Hammond, of Black Rock Mfg. Co., Bridgeport, Conn.; C. J. Harwick, Standard and Chemical Co., Akron; E. A. Hauser, of Massachusetts Institute of Technology, Cambridge; Harrison E. Howe, of *Industrial and Engineering Chemistry*, Washington, D. C.; Hycar Chemical Co., Akron; Interstate Welding Service, Akron; Fred Traflet, of Pequanoc Rubber; H. Mark, of Polytechnic Institute of Brooklyn, N. Y.; Bevis Longstreth, of Thiokol Corp., Trenton, N. J.; Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc., Passaic, N. J.; R. E. Powers, of The B. F. Goodrich Co., Akron; T. G. Richards, of Dispersions Process; Fritz Rostler, of Wilmington Chemical Corp., Wilmington; *Rubber Age*, New York; Dr. H. J. Stern, London, England; S. C. Stillwagon, Hodgman Rubber Co., Framingham, Mass.

E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., has elected to the board Lammot du Pont Copeland and Crawford Greenewalt to succeed Charles Copeland and F. B. Davis, Jr., resigned. Dr. Greenewalt is assistant director of the experimental station of the du Pont chemical department. Lammot Copeland has been associated with the rubber-coated fabrics plant and the development of neoprene products and is now in the company's development department.

L. Albert & Son, Trenton, N. J., dealer in used rubber machinery, has fully equipped the plant it recently purchased in Stoughton, Mass. The Stoughton, Trenton, Akron, and Los Angeles plants are now operating to full capacity with machinery needed by the federal government. The company also recently acquired a large storehouse at Boston, Mass.

Pennsylvania Rubber Co., Jeannette, Pa., according to President Howard W. Jordan, has appointed Roderick B. Cave sales manager and Paul C. Mathewson factory manager. Mr. Cave formerly was assistant sales manager, merchandise division, Electric Auto-Lite Co., Toledo, O.; while Mr. Mathewson recently was factory superintendent of the Armstrong Rubber Co., Inc., West Haven, Conn.

Pittsburgh Plate Glass Co., Grant Bldg., Pittsburgh, Pa., has developed a complete line of "blackout and camouflage" paints for domestic and commercial use in areas subject to possible air raids. They obscure interior illumination when applied to windows, skylights, and other glazed openings.

Bibb Mfg. Co., Macon, Ga., at a recent directors' meeting elected Scott Russell president to succeed W. D. Anderson, who will continue as chairman of the board. Mr. Russell for many year was legal counsel for the company and became executive vice president April 18, 1938. M. W. Rozar is director of sales development.

Nearpara Rubber Co., Trenton, N. J., has installed several new units to take care of reclaimed rubber production. The company has been operating overtime.

Brazilian Information Bureau of the Government of Brazil, 551 Fifth Ave., New York, N. Y., has changed its name, better to indicate its scope and functions, to the Brazilian Government Trade Bureau. Francisco Silva, Jr., is director of the Bureau.

Jos. Stokes Rubber Co., Trenton, N. J., has let a contract for transformer housings. The company is among the many which has cut its personnel because of scarcity of needed materials. The plant at Welland, Ont., Canada, however is running to capacity.

The Conference Board, National Industrial Conference Board, Inc., 247 Park Ave., New York, N. Y., recently reported from a survey of 25 manufacturers that earnings of manufacturing workers rose in November, 1941, for the sixteenth consecutive month. Hourly earnings in the rubber industry increased from 95.4¢ in October to 96.9¢ in November, against 88¢ in November, 1940. The largest increase in average weekly earnings in November, 1941, was in the rubber industry, to $37.26, contrasted with $35.72 in October and $32.17 in November, 1940. Besides rubber workers averaged 38.5 hours weekly in November, against 37.5 in October and 36.6 hours in November, 1940.

The Thermoid Co., Trenton, N. J., recently entertained 400 of its employes' children at an annual Christmas party. President Fred E. Schluter last month gave his annual dinner to 50 plant foremen and friends at the Stacy-Trent Hotel, Trenton, when several cash awards were made. A. J. Govin, president of the Foremen's Club, presided, and speakers included Mr. Schluter, H. W. Searfoss, purchasing agent; W. B. Pardoe and Walter E. Harvey, vice presidents; Lester Cox, superintendent of the rubber division; and Carl Brockway, superintendent of friction materials. R. W. Case, sales development manager, has been on a lengthy business trip to Dallas, Tex., and other points in the South and Southwest.

OHIO

Goodrich Executive Changes

The B. F. Goodrich Co., Akron, according to President John L. Collyer, on January 5 named Wm. S. Richardson general manager of mechanical goods and sundries sales, succeeding J. H. Connors who had resigned because of ill health. Mr. Richardson, with the company since 1926, formerly was general sales manager of the mechanical goods division.

Vice President J. J. Newman has announced the appointment of Thomas C. Yarnall as manager of budget sales. Mr. Yarnall, who joined Goodrich 13 years ago, was lately assistant to J. A. Hoban, merchandise manager of the company's tire division.

V. I. Montenyohl, vice president in charge of the synthetic sales division, reported that the new manager of the division, succeeding H. E. Fritz, now director of research, is John R. Hoover, who had come to Goodrich in 1925, a year after graduating from Harvard University, and recently was sales manager of the rubber-lined equipment department. Assigned to the latter post is Herman C. Klein, a B.S. from Purdue.

Reclaimed Rubber V-Belts

Mr. Richardson on January 14 announced that if military requirements will permit the use of reclaimed rubber for such purposes, the Goodrich company is prepared to market Victory V-belts made entirely of reclaimed rubber and reported to give 80% of customary service. Last year America required 22 million replacement V-belts, in which 2,325,000 pounds of natural rubber went to automobile V-belts and 2,260,000 pounds to replacements for domestic appliances.

Other Company News

Goodrich recently sold $5,000,000 3% first mortgage bonds due in 1956 to an insurance company. The sale was arranged by Goldman, Sachs & Co., and Dillon, Read & Co. of New York.

K. D. Smith, assistant to the vice president in charge of production at Goodrich, declared at an SAE meeting in New York on January 22 that examination of tires from recently captured German planes reveals that a lack of proper rubber compounding ingredients, as carbon black, age resisters, and organic accelerators, is compelling the Reich to use a product of very low quality.

Frank K. Schoenfeld, Goodrich rubber research expert, on January 20 told the New York University Group that our rubber position may become even more critical because those rubber trees that escape the scorched earth policy of British and Dutch retreat in the Far East are likely to be burned by the Japanese when they are compelled to withdraw. Thus with America's rubber supply even more seriously threatened and the huge stockpile rapidly decreasing under the vast armament program, every pound of synthetic rubber sponsored by the government, which anticipates an annual output of 400,000 tons by July, 1943, seems destined only for military purposes.

The Timken Roller Bearing Co., Canton, has transferred F. H. Lindus to sales promotion work. A graduate of the University of California, he has been with Timken since 1935, serving as Los Angeles branch manager of the Service Division until sent to the main office at Canton a few months ago.

The Firestone Tire & Rubber Co., Akron, reports that the synthetic rubber plant it is constructing under contract with the Defense Plant Corp., is scheduled to start production early this year to reach an annual total capacity of 10,000 long tons a year.

James E. Trainer, vice president in charge of production, last month was elected a director of the company.

Firestone is retreading in the original molds large earth mover tires. More than 1,600 pounds of crude rubber were used to build a 36.00-40 tire, but less than one-third is needed for the New-Tread, which is said to result in a tire returning about 80% of its original mileage.

Firestone has designed and produced and is distributing among the personnel of its vast organization a "Be Alert and Victory" poster in patriotic colors, which bears the words "Be Alert" across an American eagle whose outstretched wings form a "V" above the words "Remember Pearl Harbor."

Bullet-Proof Tires and Tubes (Manufactured by Firestone Tire & Rubber Co.) Mounted on New "Trackless" Tank Recently Tested by U. S. Army

William O'Neil, Holding a Guayule Shrub, and Jesse Jones and H. J. Klossner Inspecting the First All-Guayule Tire Ever Made

General Makes Guayule Tires

The General Tire & Rubber Co., Akron, to demonstrate that the use of guayule in making tires is practical, recently turned out a batch of tires manufactured entirely from the domesticated Mexican shrub. President William O'Neil took the first tire made to Washington, D. C., to show to Jesse Jones, Secretary of Commerce, and H. J. Klossner, president of the Rubber Reserve Co. The United States Tariff Commission recently stated an all-guayule tire will give 90% of the wear of one made from first-grade rubber from the Far East.

Annual Report to Stockholders

In his letter to stockholders, which accompanied the company's annual financial statement, Mr. O'Neil pointed out that demand for tires for military purposes had been an important item in 1941 record sales. Production was expanded rapidly to make tires for airplanes, combat cars, prime movers, bomb trailers, convoys, pontoon trailers, and other military vehicles.

In reporting on other phases of 1941 activity, he mentioned the new Akron barrage balloon plant, the expanded manufacture in the Wabash plant of gas masks, ratio antennae, and other molded rubber goods, and of research into many phases of the government's war program. Sales of mechanicals from the Wabash plant, launched five years ago, have constantly increased, and in 1941 the sales volume assumed an even greater importance in the over-all company picture.

General dealers, because of the Kraft system of tire renewing, are in good position among industry dealers, and, although passenger car sales have been sharply curtailed, General distributers with Kraft equipment are enjoying a large volume of recapping business, Mr. O'Neil pointed out.

Goodyear Report

The Goodyear Tire & Rubber Co., Akron, although adversely affected by the government's tire rationing order, reports that production of tires for military use has increased, as has output of life rafts and preservers, flotation gear, attack boats, gas tanks, gas masks, barrage balloons, and airship bags. Production of Airfoam and Pliofilm for hospital use likewise has been stepped up.

The company is making every effort to take care of those employes rendered "in excess" because of curtailed operations due to government orders. As far as possible these workers are being transferred to departments still in operation.

For its subsidiary, Goodyear Aircraft Corp., the outlook for 1942 is most favorable. As great as was the expansion last year, requirements this year will necessitate even greater growth. Plant B, 500 by 200 feet, is being enlarged by an addition 200 by 300 feet. The company is operating three, eight hour shifts, seven days a week, but peak production is not expected for several months. The payroll now numbers more than 4,000, but will be increased to at least 10,000.

Goodyear's new Chemigum plant is in operation now making more than seven tons of synthetic rubber a day. The company is also constructing a Defense Plant Corp. unit capable of 2,500 tons of synthetic annually, with a potential capacity of 10,000 tons a year.

Transfer of Personnel

Factory Manager W. S. Wolfe has announced several organization changes. S. B. Kramer and E. R. Wolfe have been made night superintendents; while J. E. Stafford, besides being superintendent of the mechanical goods division, has also been put in charge of bullet-proof tank manufacture. E. T. Ruffner, formerly superintendent of the Goodyear factory at Buitenzorg, Java, was named consultant to Dept. 137, spreaders and cement mixing. A. E. Bethel has been transferred to the New Bedford plant.

Fred W. Climer, director of personnel also announced several changes affecting Goodyear and its Aircraft staffs. R. S. Pope is now personnel manager for the Aircraft corporation, and R. W. Maney, superintendent of Plant 1, has succeeded him as factory personnel manager. W. E. Thomas, acting personnel manager at Aircraft, has been assigned to new duties in the personnel division. D. E. Sheahan, Plant 2 superintendent, has become Plant 1 superintendent, with W. E. Denny temporarily in charge of the Plant 2 tire division.

Harry I. Belknap has been made superintendent of the St. Marys Mfg. Co., St. Marys, O., Goodyear subsidiary, succeeding I. D. Patterson, transferred to the Goodyear development department at Akron. A. A. Teisher, manager of mechanical goods design, has been assigned to Mr. Belknap's former post, superintendent of the Airfoam division. D. E. Harpfer is now manager of mechanical goods design.

The Faultless Rubber Co., Ashland, has received a contract from the City of Cincinnati for 100 gross of surgeon's gloves (pairs), costing $2,424, for use at General Hospital.

The Arco Co., Cleveland, is marketing a new type of low visibility paint said to possess exceptional heat deflecting qualities and recommended for use in the protective concealment of defense equipment and structures. "Infray", as this paint is known, comes in seven shades and already has met tentative Navy specifications for infra-red reflecting paints for use on fuel storage tanks, buildings, and certain types of equipment where dark colors as well as heat reflecting qualities are required.

MIDWEST

Thirty-five rubber firms in the Midwest recently reported paying 24,193 workers $853,000 in wages, a decline of 0.2% in employes, but an increase of 4.2% in earnings over the previous month.

J. D. Powell, of Skelly Oil Co., Kansas City, Mo., has been named to the 1942 General Committee of the American Petroleum Institute's Division of Marketing.

United Carbon Co., Inc., Charleston, W. Va., has moved its Chicago, Ill., office and warehouse to 3217 W. 47th Place. C. M. Baldwin is Chicago district manager.

OBITUARY

John F. Palmer

JOHN FULLERTON PALMER, a pioneer in the development of the cord tire, died in California, November 9, 1941, after a brief illness. He was born August 30, 1860 in Iroquoi Co., Ill., where he completed a common school education, and moved to Chicago when a young man. His association with the rubber industry began in 1891 when he invented the "all warp" or parallel thread fabric first used on bicycle racing tires. The following year Mr. Palmer organized the Palmer Pneumatic Tire Co. for manufacturing tires embodying the thread fabric principle. In 1893 he organized Palmer Tyre, Ltd., a British company to which he sold his foreign patents.

Later Mr. Palmer used the bicycle tire invention as a nucleus for the construction of cord tires for automobiles and was granted many patents. His inventions resulted in a long association with The B. F. Goodrich Co. Further research and developmental work was done in association with the Hewitt Rubber Co., Buffalo, N. Y., The Seiberling Rubber Co., Akron, O., and several other companies for which he acted as consultant.

A wife, two sons, and two daughters survive.

Roy S. Trowbridge

AFTER a brief illness Roy S. Trowbridge, chief engineer of the Pequanoc Rubber Co., Butler, N. J., with which he had been associated about three decades, died last month. He was also a former member of the Butler Board of Education and belonged to the Bloomingdale Baptist Church, where he had been choir director many years.

Mr. Trowbridge was born in Chatham, N. J., 66 years ago.

He leaves a wife, two daughters, a sister, and two brothers.

Burial was in Fairmount Cemetery, Chatham.

Frank Tintle

FRANK TINTLE, inventory controller of the Pequanoc Rubber Co., Butler, N. J., died December 24 following an 11-week illness. He had worked for the company 24 years and previously had been with the American Hard Rubber Co.

The deceased was a former member of the Bartholdi Hose Co. of the Butler Volunteer Fire Department and also belonged to the Pequanoc Valley Rod & Gun Club and the Holy Name Society.

Survivors include the widow, two daughters and an adopted son, two brothers, a sister, and grandchildren.

A high requiem mass was sung December 27 at St. Anthony's Church, Butler, with interment in Mount Calvary Cemetery.

Edward E. Allen

Edward E. Allen, 74, former president of the Allen Machine Co., now the National-Erie Corp., Erie, died January 22 at St. Vincent's Hospital, Erie, Pa., after a brief illness. He had retired from business 15 years ago. Mr. Allen had had wide experience in designing and manufacturing machinery for the rubber industry and was considered an authority on tubing.

Funeral services were held January 26 at his late Erie Residence. Burial was in Lakeside Cemetery.

He is survived by a wife, a sister, a son, a daughter, and grandchildren.

Roger N. Wallach

ROGER N. WALLACH, chairman of the board and founder of the Sylvania Industrial Corp., and a founder, president, and a director of Filatex Corp., both of 122 E. 42nd St., New York, N. Y., died at his home in Briarcliff Manor, N. Y., December 7, at the age of 59. Dr. Wallach was also treasurer and a director of Associate Owners, and before going to Sylvania in 1929 had been a vice president of the Grasselli Dyestuffs Corp.

Surviving are his wife, two daughters, and a brother.

C. A. Shaler

AN ACCIDENTAL fall from his apartment in Pasadena, Calif., resulted in the death on December 16 of Clarence Addison Shaler, retired president of the Shaler Co., manufacturer of tire vulcanizing equipment, etc., Waupun, Wis. He had also been president of the Shaler Umbrella Co.

Mr. Shaler was born in Mackford Prairie, Wis., on May 29, 1860. He attended Ripon College, but did not graduate because of ill health. Later, however, he received an honorary M.A. from the institution.

He had formed the Shaler Co. in 1907 and retired in 1927.

Funeral services and interment took place in Waupun on December 20.

A daughter survives.

Willard H. Combs

CORONARY thrombosis caused the death, December 20, of Willard H. Combs, in charge of tire construction at the Corduroy Rubber Co., Grand Rapids, Mich. The deceased, born in Hartville, O., September 16, 1886, and reared in Akron, began his career with the rubber industry in 1903 when he joined the Goodyear Tire & Rubber Co. After 12 years he went to the Quaker City Rubber Co., Philadelphia, Pa., and in 1926 was employed by the Corduroy concern.

Mr. Combs leaves a wife, his mother, three daughters, two sons, a brother, and a sister.

Funeral services were held in Grand Rapids, December 22, with burial in Restlawn Cemetery.

CANADA

Regulations on the Use of Rubber

According to C. D. Howe, Minister of Munitions and Supply, "without exception no rubber will be released in future for the manufacture of non-essentials." The ban became effective January 1, 1942. Manufacturers will be permitted a quota of only 50% of the rubber they used during the year ended May 31, 1941.

The new regulations specify a long list of articles which the Controller of Supplies, Alan H. Williamson, may, in his discretion, designate as necessary for the war effort and for absolutely essential civilian purposes, as follows:

1. Medical, surgical, and laboratory supplies, also druggists' sundries for the feeding of infants and the care of the sick.
2. Sealing rings and compounds for canning and for packing and wrapping foods.
3. Protective rubber clothing, gloves and footwear for fire fighting and police departments and others who require same in the course of their employment; and protective rubber clothing, gloves, footwear, and equipment for electrical and acid workers.
4. Mechanical rubber goods, hard rubber and sponge rubber products, and compounded latex for industrial plants and mines, fire department transportation companies, and public services operated in Canada.
5. Component parts made wholly or partly of rubber for incorporation in articles of various kinds, if the Controller has first stated in writing that the use of rubber is necessary in their manufacture.
6. Rubber compounds for use in making insulated wire and cable.
7. Suction and gasoline hose.
8. Plumbers' supplies, if the Controller has first stated in writing that the use of rubber is necessary in their manufacture.
9. Tires seven inches or more in cross-section (industry marketing) for other than private passenger cars, and tubes for same.
10. Tractor tires and farm implement tires.
11. Tires and tubes for delivery to manufacturers of motor vehicles to be used for equipment for new motor vehicles made for sale in Canada, on the understanding that no spare tire or tube will be supplied to the vehicle manufacturer for any such vehicle.
12. Bicycle tires.
13. Tire repair materials other than tire repair kits.
14. Camelback for retreading.
15. Automotive parts, if the Controller has first stated in writing that the use of rubber is necessary in their manufacture.
16. Rubber cement for the shoe trade or for such other purposes as the Controller states in writing necessitate the use of rubber.
17. Staple black lines of waterproof footwear.

To avoid wastage and assist in the conservation of rubber, elastic is to be provided for civilian sale in Canada in future in lengths limited to four yards. The restriction which applies whether

the elastic is on cards or spools, in hanks or bunches, was announced January 1 by P. H. Boivin, director of narrow fabrics for the Wartime Prices and Trade Board, who is attached to the board's national textile-clothing division of price administration. Mr. Boivin said that in the past housewives were able to buy elastic in lengths of from five to fifteen yards or more, and often much of a spool would lie unused and deteriorate.

Mr. Howe also announced an order making it a criminal offense to "burn, cut, or destroy" any rubber tire, tube, or casing, and providing penalties of fines up to $5,000, or five years' imprisonment, or both. Persons engaged in the rubber industry are exempt from its provisions. The order, issued January 12 by J. R. Nicholson, Deputy Controller of Supplies, and approved by R. C. Berkinshaw, chairman of the Wartime Industries Control Board, became effective immediately.

Tire Sales Restricted

C. D. Howe, Minister of Munitions and Supply, last month issued a modification, effective January 5, 1942, of the order issued December 11, 1941, banning all sales of tires and tubes in Canada. The modification limits the sale of new tires and tubes, when the need is proved, to "a small group of essential users" as follows:

1. Vehicles operated by physicians, visiting nurses, or veterinarians, which are used principally for professional services.
2. Ambulances.
3. Vehicles used exclusively for fire-fighting, police work, garbage disposal, and mail delivery.
4. Vehicles for 10 or more passengers operated exclusively for carrying passengers as part of services rendered to the public by a regular transportation system where no other public transportation facilities are available.
5. Vehicles for 10 or more passengers used for carrying students and teachers.
6. Vehicles for 10 or more passengers used for transporting employes to any industrial or mining establishment except when public transportation facilities are available.
7. Vehicles for five or more to carry passengers to and from airports.
8. Vehicles for five or more to carry fare-paying passengers in rural and sparsely settled areas where other facilities are not available.
9. Vehicles for road building and repairs.
10. Trucks for carrying material and equipment for construction and maintenance of production facilities.
11. Trucks for carrying material and equipment for building defense housing and military and naval establishments.
12. Trucks for repairs to plumbing, heating, and electrical equipment.
13. Trucks for carrying waste and scrap.
14. Trucks used for any common carrier, but not for delivery to private homes.
15. Trucks for ice and fuel, but not for delivery to private homes.
16. Trucks for transportation of raw materials, semi-manufactured goods, and finished products, including farm products and foods, but not for transportation of any of these to private homes.

Those on the eligible list will be required to fill in a form furnished by the Deputy Controller of Supplies and provide a used tire or tube from a running wheel or spare rim before a new purchase is allowed. No payment will be allowed for the old tire or tube. No restriction is placed on the sale of used tires and tubes, but purchasers will be required to prove their need. Dealers will be compelled to keep exact records and will be subject to penalties up to a $5,000 fine or five years' imprisonment, or both, for violations.

Canadian citizens have been asked by the Controller of Supplies to report any sales of new or unused rubber pneumatic tires or tubes. A few reports, he said, had come to his office of violations of the order prohibiting such sales. The buyer and the seller are equally guilty, he warned.

Seiberling Rubber Co. of Canada, Ltd., Toronto, Ont., reported net sales for the year ended October 31, 1941, were the best on record, and approximately 130% higher than in the previous year. Owing to government restrictions on rubber manufacture, however, the directors decided against declaring a dividend.

FROM OUR COLUMNS

50 Years Ago—February, 1892

There are three large India-rubber factories in Russia, all of which are of recent origin, but which have been managed so successfully that the industry has already become an important one in that country. (p. 137)

The natives in Nicaragua to make cloth waterproof add a small percentage of sulphur or gunpowder to the fresh milk (latex) and boil for a short time. Then they stir the mixture and spread it over the stretched cloth. (p. 140)

The British Government has seriously undertaken the protection of all the rubber forests within its empire, while the various republics of South America are beginning to be interested. (p. 141)

There has never been any pressing need for rubber-tree culture, which renders all the more creditable the enterprise which has demonstrated on both hemispheres the susceptibility to cultivation of every important rubber-producing species in case the need should ever arise. (p. 141)

In a table of the consumption of India-rubber by the United States and Canada, the deliveries to manufacturers are reported to have increased from 9,903,000 pounds in 1876 to 34,367,000 pounds in 1891. (p. 155)

25 Years Ago—February, 1917

Ex-President William H. Taft in his talk to the Rubber Club of America emphasized the rubber producing possibilities of the tropical and semi-tropical areas within our national jurisdiction, and said that our agricultural authorities should be awake in their researches to investigate the feasibility of raising rubber in Texas and in those regions of the United States which resemble Mexico. He also mentioned the guayule industry and its interruption by the deplorable conditions of anarchy existing in Mexico. (p. 251)

Ocotillo gum provides an excellent gum to add to all friction stocks as it has the valuable power of causing the rubbers commonly used in friction stock to make a better union by penetrating the intricacies of the fabric. This is one of the very valuable characteristics of guayule. (p. 277)

The Japanese importation of crude rubber during the last year was estimated to be 3,903,552 pounds, and showed 1,595,771 pounds increase over that of the previous year. (p. 292)

While plantation acreages continue to increase in several regions of the Far East, the greater production of the past year is due chiefly to increased yields per acre. (p. 302)

Export Permits for Rubber Goods

Rubber tires and tubes, solid rubber tires for motor cars and trucks, and rubber semi-manufactures and manufactures, are subject to the export permit requirements when shipped to any country outside of Canada, including British Empire destinations, under an order of the Export Permit Branch of December 11, 1941, effective December 12. Export permits already issued for such goods dated December 11, 1941, and prior thereto, have been canceled, and shipment covered by waybills or bills of lading dated December 11, and later, to British Empire destinations, must have export permits.

Limited Retreading Foreseen

Tire retreading in Canada will be restricted by the amount of rubber available and by limited equipment Canadian Government officials announced January 17. Rubber is being allotted on a straight priority basis with no definite amount earmarked for retreading, which in the past has not been extensive, and equipment is only available in larger centers. Wartime restrictions reduce the possibility of dealers installing new machinery, and it is expected that many motorists will be forced to satisfy themselves with having weak spots in their tires vulcanized rather than having the tire retreaded.

EUROPE

U. S. S. R.

The effect of resting on nerve recovery is shown below:

Resting Period Days	Kok-Sagyz Plasticity	Kok-Sagyz Recovery	Pale Crepe Plasticity	Pale Crepe Recovery
2	1.50	0.08	2.33	0.10
3	1.51	0.08	2.43	0.10
4	1.53	0.08	2.47	0.10
6	1.55	0.08	2.48	0.10
8	1.55	0.08	2.48	0.10
13	1.55	0.08	2.46	0.10
23	1.55	0.05	2.46	0.10

Plasticization Period, Minutes	Kok-Sagyz After Resting 1½ Hours Plasticity	Kok-Sagyz After Resting 1½ Hours Recovery	Kok-Sagyz After Resting 24 Hours Plasticity	Kok-Sagyz After Resting 24 Hours Recovery	Pale Crepe After Resting 1½ Hours Plasticity	Pale Crepe After Resting 1½ Hours Recovery	Pale Crepe After Resting 24 Hours Plasticity	Pale Crepe After Resting 24 Hours Recovery	Energy Used Watt-Hours Kok-Sagyz	Energy Used Watt-Hours Pale Crepe
0	...	...	3.42	0.30	...	...	5.35	2.18	...	...
3	3.25	0.66	3.26	0.58	4.72	1.64	4.82	1.70	265	410
6	2.37	0.17	2.42	0.15	3.56	0.59	3.77	0.60	440	615
9	2.08	0.08	2.09	0.09	3.18	0.44	3.27	0.43	592	780
12	1.91	0.07	1.93	0.07	2.67	0.16	2.81	0.17	725	932
15	1.71	0.05	1.76	0.06	2.57	0.10	2.69	0.13	870	1005
18	1.62	0.05	1.65	0.11	2.43	0.11	2.59	0.14	1020	1115
21	1.52	0.06	1.56	0.06	2.32	0.11	2.42	0.10	1110	1275
									5012	6132

C_6H_6 Rate of Flow T. Sec.	Kok-Sagyz Unmilled T. Sec.	Kok-Sagyz Unmilled Relative η	Kok-Sagyz Milled 4 Min. T. Sec.	Kok-Sagyz Milled 4 Min. Relative η	Kok-Sagyz Milled 21 Min. T. Sec.	Kok-Sagyz Milled 21 Min. Relative η	Pale Crepe Unmilled T. Sec.	Pale Crepe Unmilled Relative η	Pale Crepe Masticated 21 Min. T. Sec.	Pale Crepe Masticated 21 Min. Relative η
13.8	90.6	6.56	50.3	3.64	28.5	2.06	229.0	16.59	46.3	3.35
8.1	45.6	5.63	26.0	3.20	15.2	1.87	107.9	13.32	25.7	3.17
6.0	30.8	5.13	17.8	2.96	10.8	1.80	68.0	11.33	17.4	2.90
4.7	22.5	4.78	13.9	2.95	8.3	1.76	48.0	10.21	13.5	2.87
4.0	17.9	4.47	11.1	2.77	6.9	1.72	36.3	9.07	10.8	2.70
3.6	14.9	4.13	9.3	2.58	6.0	1.66	29.0	8.05	9.3	2.58
3.2	12.5	3.90	7.9	2.46	5.0	1.56	23.9	7.46	7.9	2.46
2.9	10.8	3.72	7.0	2.41	4.7	1.62	20.1	6.34	7.1	2.44

Properties of Kok-Sagyz

A series of investigations on the chemical, physical, and mechanical properties of *Kok-sagyz* was carried out by B. V. Fabritziev and M. T. Vishnevskaya, of the Scientific Research Institute for Rubber. The rubber used for this purpose was obtained from year-old plantation *Kok-sagyz* which had been produced as follows.

The roots of the plants were steamed in hot water, then crushed between rolls; this action was followed by heating with 2% alkali at a temperature of 100 degrees from 3½ hours; finally the material was washed and creped; the end product resembled dark crepe and contained 12.2% moisture. This was dried by hanging in a darkened place at room temperature. The rubber became darker and more and more tacky as drying continued. The dried rubber, carefully formed into one block, was found to have a specific gravity of 0.898, and the chemical composition was:

Moisture	1.2%
Acetone abstract*	6.7%
Residue insoluble in chloroform	9.3%
Protein (N x 6.25)†	3.9%
Ash‡	1.8%
Chloroform extract (by difference)	77.1%
	100.0%
Aqueous extract	neutral

*Acid number of resin (on the acetone extract), 22.4.
†Nitrogen, 0.62%.
‡Mn, 0.003%; Fe_2O_3, 0.02%.

Plasticity Measurements

Experiments on plasticity were carried out on *Kok-sagyz* and, for comparison, on pale crepe. For this purpose 900 grams of each kind of rubber were milled on laboratory rolls 8 by 16 inches for 21 minutes with rolls at 50-55° C. A sample for testing plasticity was taken every three minutes, and plasticity was determined after rest periods of 1½ and 24 hours, by means of a Williams apparatus. The energy consumed in plasticization was measured by an automatically recording watt-meter made by Hartmann & Braun. In these calculations the energy consumed by rolls running without load is not included. The results obtained are shown in the first table at the head of this column.

It will be noted that the initial plasticity of *Kok-sagyz* (unmasticated) is very close to that of pale crepe masticated for six to seven minutes. Final plasticity of *Kok-sagyz* after 21 minutes of mastication is considerably higher than that of pale crepe; consequently the former requires no preliminary mastication before it can be compounded.

Viscosity Measurements

For the viscosity tests two grams of each type of rubber—*Kok-sagyz*, unmasticated and masticated for four and for 21 minutes, and pale crepe, unmasticated and masticated for 21 minutes—were dissolved in 100 cm.³ benzol. None of the *Kok-sagyz* samples dissolved without leaving a residue; the benzol took on a deep brown color. Samples of pale crepe gave transparent solutions in benzol; unmilled crepe dissolved completely.

Viscosity was determined with the Ostwald viscosimeter in combination with a monostat with water pressures ranging from 0 to 70 centimeters at 20°. Results are shown in the table directly above.

The relative viscosity of unmilled crepe (16.59) at 0-centimeter pressure is 2.5 times as high as that of unmilled *Kok-sagyz* (6.56). As the figures show, plasticization considerably decreases relative viscosity for both types of rubber.

Results of capillarity tests were in complete agreement with the viscosity data. Capillary elevation for pale crepe masticated for 21 minutes (54.6 millimeters) was found after 10 minutes to be 5.2 times as high as that of unmasticated crepe (10.5 millimeters). The capillary elevation of *Kok-sagyz* for the same time was 30 millimeters for unmasticated, 47.1 millimeters for that plasticized for four minutes, and 60 millimeters for that plasticized for 21 minutes; that is, the elevation increased 1.5 and two times.

Samples of *Kok-sagyz* and pale crepe left to swell in benzol for two minutes showed the following changes in size:

	Original Size in Cm.³	Size after 2 Min. Swelling
Kok-Sagyz, unmasticated	1.0	2.0
plasticized 4 min.	1.0	1.2
21 min.	1.0	1.1
Pale Crepe, unmasticated	1.0	2.6
masticated 21 min.	1.0	1.3

GERMANY

Repairing Rubber Footwear

The Germans, even before the Hitler regime, had considered ways of repairing rubber footwear, and suitable appliances

were devised. In view of the present rubber situation it may be of interest to report the methods recommended in Germany not more than a year ago.

The work can be done by either tire repair shops or, if on a large scale, at a footwear factory. In the first case lasts, suitable hand presses (heated or not) and, for some purposes, pressure pads and thin metal plates are the chief mechanical aids required; in the second, regular vulcanizing kettles must be used.

The most important rules to be observed are: (1) All footwear must be thoroughly dry before any repairs are undertaken, especially where the damages reach right through to the lining. In these cases the parts to be repaired should be opened up and dried by means of compressed air or in a vacuum. (2) The surfaces to be treated must be ground and then roughened to insure proper adhesion of repair parts, and the under surfaces of the latter should also be roughened. (3) All the surfaces requiring treatment must be thoroughly cleaned with benzene or a stiff brush.

In Germany vulcanized and varnished parts for uppers as well as vulcanized soling materials are supplied by factories and are attached with the aid of suitable self-vulcanizing latex-base, or benzene solutions. A preparation of this kind actually is marketed as two distinct, but complementary fluids packed separately; one is applied to the repair material and the other to the part to be repaired; and curing does not take place until this is done, and the two parts have been united. One product of this type, supplied by the I. G. Farbenindustrie under the name Cosavult, comprises an aqueous preparation and a rapidly drying mixture. The first must be allowed to dry for at least an hour before the parts are brought together, but the second is applied shortly before this step is taken.

The procedure to be followed in small shops for sole renewing, is to mount the shoe, after it has first been prepared, as described, and the new sole has been put in place, on one of the various presses supplied by manufacturers of shoe machinery for the purpose. Then pressure is applied. If a device is employed which relies on pressure without heat, the shoes must be kept on the press 24 hours in a room having an even temperature of 30 to 35° C.

If a heatable apparatus is used, together with appropriate materials, the process takes only about half an hour. A suitable device of this type, for use with unvulcanized soling material, is known as the Universal press and consists in the main of a shaped base plate having a raised diamond or pyramid pattern, a pressure arm with movable plate, and the stand holding these together. The shoe with the new sole in place is mounted on the pressure arm carrying the movable plate

(these parts together form a kind of last), and the whole is placed in the stand to the bottom of which the base plate has been fixed. Then the new sole is pressed firmly and evenly against the steam or electrically heated base plate by the action of press-screw and clamp.

The base plate is so constructed that it can be used for all sizes of soles and heels. It is provided with narrow, adjustable, curved sections fitted over its edge like a border, and there are screws by means of which this border can be displaced, thus permitting the regulation of the heating surface to conform to any size of sole. With different, curved sections, the same plate also serves for heels of all sizes.

The structure of the Universal press permits the free exposure to the air of the room of the upper parts of the shoe which, therefore, are not affected by the curing process. It is considered best to work at as low a temperature as possible, with a rapidly curing mix. Some mixes which can be used vulcanize completely in half an hour at 105 to 110° C.

When repairing is carried out on a large scale, unvulcanized material only is recommended. The soles or heels are roughened as before, and in most cases solutions are used which contain the necessary amounts of sulphur, a fairly rapid accelerator, the necessary amounts of active zinc oxide, but no other filler. Benzol or trichlorethylene is the preferred solvent. Curing takes place in vulcanizing kettles; temperature and curing time are being kept as low as possible. In this connection it is pointed out that modern footwear made of compounds protected by antiagers withstand a second curing very well, provided there has previously been no over-exposure to the sun.

The above methods, of course, refer only to heel and sole repairing. For more intricate repairs other and more elaborate methods are used. Cuts and small defects are easily remedied by first coating the places with the solution used in small-scale repair work, and after this has thoroughly dried, treating with a self-vulcanizing paste.

Soya Bean Oil Synthetic Rubber Base

A note contributed to the London *Rubber Age* reveals that a few years ago two German scientists used soya bean oil as the base for a synthetic rubber. It seems that the oil was converted into a glutinous acid product by nitric acid and then treated with dilute alkalies. This in turn was "treated to a temperature of 150° F." whereby a tough material that resembled rubber was obtained.

GREAT BRITAIN

New Reenforcing Agent

At the June 9 meeting of the London Section of the Institution of the Rubber Industry, J. R. Scott discussed "Neosyl MH, a New White Reenforcing Agent", a special form of precipitated silica. Dr. Scott pointed out that while precipitated silica had been tested as a reenforcing material in Russia and to some extent in Germany, it had, despite a strong reenforcing effect, not been adopted as a compounding ingredient, apparently because of its marked interference with the action of accelerators.

In England experiments were conducted by the Research Association of British Rubber Manufacturers with silica gel and a precipitated silica produced according to British patent Nos. 294,681, 299,483, and 357,993, with similar results, but it should be added that the precipitated silica known as Neosyl C was found to have valuable properties as a filler for ebonite. Next a modified form of precipitated silica containing about 5% of magnesium as oxide, combined or closely associated with the silica, was tested by Dr. Scott.

He found that besides its reenforcing action, it possesses definite advantages over the other white rubber fillers: namely, comparative absence of grain effect owing to the amorphous isotropic character of its particle, an exceptional stiffening

effect on unvulcanized stocks which is useful in preventing deformation during open steam vulcanization (tubing and insulation stocks), and production of vulcanizates with better tear resistance and much lower permanent set than are obtained with materials like magnesium carbonate and clay. Other outstanding characteristics noted are: low specific gravity (2.1) and pronounced toughening and hardening effect; a moderate reenforcing power which persists up to relatively high volume loadings, apparently because Neosyl MH is readily dispersed and wetted by rubber. It has no detrimental effect on aging and is compatible with all usual organic accelerators, markedly increasing the rate of cure with some.

On the other hand it has a tendency to scorch; however this defect should offer no difficulties if reasonable care is used. Also, as made hitherto, it tends to increase the hygroscopicity of the vulcanizate.

The tests further indicate that Neosyl MH is a promising reenforcing agent for brown and other colored soling rubbers. It can replace either French chalk or zinc oxide and French chalk together, in cable insulation stocks without impairing physical properties. But here the increased hygroscopicity of the rubber must be taken into account. Neosyl MH can replace zinc oxide in certain mixes where the latter is used in large proportions as reenforcer, but enough zinc oxide must be retained to activate the accelerator. In this connection it may be added that replacement of zinc oxide by Neosyl MH appears to improve aging. A final point in favor of the new filler is that it is made from raw materials abundantly available in England.

From the health point of view, it was reported that the pure silica made according to the three above patents has been produced on a commercial scale for more than 10 years without a single case of silicosis among the workers handling it.

Both Neosyl MH and Neosyl C are produced by Peter Spence & Sons, Ltd., Manchester and London.

Eaton Receives Colwyn Gold Medal

The Colwyn Gold Medal for 1941 was awarded to Lt.-Col. B. J. Eaton, formerly director of the Rubber Research Institute of Malaya, in recognition of his valuable work on investigations of problems connected with the cultivation, collection, and preparation of plantation rubber. Presentation occurred at an I.R.I. luncheon with Sir George Beharrel taking the chair in the absence of the president of the Institution, Sir Walrond Sinclair. Colonel Eaton was connected with the rubber industry in the Far East for 30 years, going to Malaya in 1906, incidentally as the first research chemist in the Federated Malay States, and retiring in 1936.

FAR EAST

MALAYA

The use of expensive, modern planting material requires greater care than ever by planters since failures can be very costly, hence managers are seriously watching the behavior of their trees, marking abnormalities and seeking to find the right explanations and remedies. The Planting Correspondent of the *Straits Budget* recently discussed optimum growth of rubber trees, a problem put before him by an estate manager who pointed out that the optimum rate of growth had never been considered; the accepted standard for judging the success of a clearing of young rubber is the rate of growth—the quicker the growth, the better. But it had been the manager's experience that in many cases the best grown

and healthiest looking trees were the first to go dry after tapping started, while there frequently was no sign of Brown Bast disease, usually found in trees that go dry.

Turning specifically to clones, this manager stated that slower growing clones like Avros 50, show a much smaller proportion of dry trees than faster growing and better yielding clones like Tjirandji 1 or Glenshiel 1 so that after 20 years the first might still be carrying a stand of say 100 trees to the acre, while the other two, so spectacular when young, would gradually have dropped, tree by tree, out of the race. He then suggested that manuring, hence over-stimulating young rubber, might lead to dry trees in the future and that experiments should be made in retarding the growth of trees, especially in coastal flats and peats, where dry trees apparently were more prevalent.

These points were taken up by the Planting Correspondent with two other planters and an estate scientist of high repute. The latter replied that he had long believed that a system of alternately stimulating and depressing the tree might prove beneficial, and that when enough was known about these reactions, it would be possible to evolve a suitable method for giving this treatment. One of the planters, while holding that manuring was being overdone in Malaya and had caused more harm than was realized, did not agree that retardation of growth was either desirable or practicable. Incidentally, the view is gaining that there is too much manuring in Malaya.

The second planter considered that drying up is an inherited characteristic associated with high yields. Referring to clone Avros 50, he said that on his estate there were indications that this clone, which was a slow grower and comparatively low yielder when young, shows increasing tendency to dry up as its output approaches the 1,000-pound-per-acre mark. He believes that there must be a clone—if one could find it—which combined high yield with a minimum of drying, and it should be attempted to solve this breeding problem, rather than to regulate growth.

CEYLON

"The Administration Report of the Acting Director of Agriculture for 1940" states that although there is a very good demand for Ceylon latex in India, local producers show little interest in this line, and in 1940 only 11 tons of latex were exported. Rubber exports amounted to 88,168 tons in 1940, against 60,243 tons in 1939; while the average export for the five years 1935-1939 was 56,961 tons.

The Rubber Research Scheme, Ceylon, has continued studies of local and imported clones, and certain areas of bud-grafted rubber were tapped on a commercial scale with satisfactory results. This organization manufactures normal and concentrated latex for shipment, work which was also carried out during 1940.

Before the war Ceylon obtained tires chiefly from the United Kingdom, United States, Japan, and France. The present conditions have naturally eliminated some of these countries as suppliers of tires, and this and other causes have led to a substantial increase in the price of tires to the local consumer. Lately the situation has been aggravated by much abnormal buying of tires, presumably by speculative elements, and the supply, particularly of heavy-duty tires, available to the public—already somewhat limited because of smaller shipments—is now definitely short, a situation which has furnished an excellent excuse for outright profiteering.

Imports of automobile tires during the first eight months of 1941 totaled 16,323 units, value 437,477 rupees, against 16,586 units, value 402,423 rupees, in the same period of 1940. But the shortage in arrivals of heavy-duty tires was much greater; shipments in the 1941 period were 11,129 units, value 848,417 rupees, against 12,485 units, value 855,927 rupees. However, it is expected that shipments of tires manufactured in India and due to arrive in Ceylon shortly will put an end to profiteering in these goods.

Editor's Book Table

BOOK REVIEW

"A.S.T.M. Standards on Rubber Products." Prepared by A.S.T.M. Committee D-11 on Rubber Products. Published by the American Society for Testing Materials, 260 S. Broad St., Philadelphia, Pa. December, 1941. Paper, 6 by 9 inches, 280 pages. Price, $1.75.

The latest edition of the "A.S.T.M. Standards on Rubber Products, gives in the approved form 39 specifications and test methods for rubber and rubber products. It includes several new standards first issued during 1941 and incorporates numerous revisions of standards previously issued or approved.

There are 19 general test methods covering chemical analyses, sample preparation, accelerated aging, adhesion, hardness, tension, compression set, abrasion resistance, ply separation and cracking of rubber products, resistance to light checking, state of cure (T-50), compression-deflective characteristics, indentation of rubber, etc. Included in this section are two tentative tests (Tear Resistance of Vulcanized Rubber, and Compression Fatigue of Vulcanized Rubber) first issued in 1941; and proposed drafts of tests for Accelerated Light Aging of Rubber Compounds, and Calibrating a Light Source Used for Accelerating the Deterioration of Rubber.

Five standards for rubber hose and belting include a tentative method of testing automotive air brake and vacuum brake hose newly issued. Four specifications for rubber gloves, matting, and tape, and a testing method and five specifications for insulated wire and cable are given. Tentative methods for sampling and testing rubber latex and asphalt composition battery containers, both issued in 1941, are contained in the section on Latex, Rubber Cements, Sponge, and Hard Rubber Products.

An 11-page classified bibliography reports important recent sources of information on the properties and testing of rubber, and there is a list of the personnel and subcommittees of Committee D-11.

NEW PUBLICATIONS

"Cambridge Precision Instruments. List CEC." Cambridge Instrument Co., Inc., 3732 Grand Central Terminal, New York, N. Y. 4 pages. The illustrated descriptive matter covers industrial models of analyzers, indicators, and gas and pH recorders that measure with laboratory accuracy. Mold, needle, surface, and combination pyrometers for temperature determination in the processing of rubber, plastics, and other materials are featured.

"Witco Products." Wishnick-Tumpeer, Inc., 295 Madison Ave., New York, N. Y. 168 pages. Indexed. The revised third edition of this catalog and guide to compounding materials for the rubber and other industries gives the latest information on the firm's products. The technical data supplied for the various ingredients discussed include descriptions, applications, properties, analyses, specifications, packing, etc. Materials of interest to rubber manufacturers include the following: carbon blacks; a wide variety of colors; lithopone, titanated lithopone, titanium dioxide, zinc oxides; dryground and bleached barytes, rubber clay, blanc fixe, micas, magnesium oxide, magnesium carbonates, calcium carbonate, softeners, plasticizers, solvents, guanidine-type accelerators (DPG and DOTG), activators, dispersing agents, factice, sulphur, stearates, stearic acid, and stearites. The compact presentation of factual information covering the broad field of aids in rubber compounding makes this well-bound little volume a useful reference for the trade.

"Processing Machinery for Reclaiming Rubber." Catalog No. 37-A. Robinson Mfg. Co., Muncy, Pa. 12 pages. This illustrated catalog describes the operation of Robinson machinery designed for or applicable to the treatment of scrap rubber for reclaiming. The equipment covered includes: a crusher for pre-crushing to uniform size hard and semi-hard rubber; cutters for the reduction of soft rubber; a hammer mill for breaking and reducing battery boxes, covers, etc.; grinders for reducing pre-cut scrap into a uniformly fine product; an attrition mill for grinding hard rubber into a fine powder; sifters for sifting and grading all types of ground scrap; and conveyers of a wide variety.

"Zinc in War." The New Jersey Zinc Co., 160 Front St., New York, N. Y. 4 pages. This folder describes and illustrates the many uses of zinc in production of war equipment including zinc oxide as a reenforcing agent in rubber compounds for fire and air hose.

"Laboratory Report on Electrical Resistivity and Stress Strain Characteristics of Various Grades of Spheron in Rubber, Neoprene, Hycar and 'Thiokol'." Godfrey L. Cabot, Inc., 77 Franklin St., Boston, Mass. 5 pages. This manual presents a statistical report on three premium priced types of Spheron, which are said to impart lower resistivity to rubber, and synthetic rubber compounds than do other cheaper blacks. Recommendations for use based on specified carbon black loadings are given for rubber and the three synthetic compounds tested. The tests were conducted on compounds containing the three types as well as the common and less expensive carbon black types. The report consists of compound recipes with data on the following physical properties of the resultant mixtures: stress-strain, T-50; hardness; and electrical resistivity.

"The Royle Forum." December, 1941. John Royle & Sons, Paterson, N. J. 8 pages. This issue of the *Forum*, devoted to the firm's line of extrusion machinery, contains a brief article on abrasion-resisting steel screws in which a hard-surface metallic coating is fused to the lands of the threaded portion of the screw for use with cylinder liners made of Xaloy steel which has a hardness value of 68 on the Rockwell-C scale. Among other articles are one on guayule and one on the October, 1941, fire at Firestone's Fall River plant.

"Wheelco Thermocouple Data Book and Catalog." Bulletin No. S2-3. Wheelco Instruments Co., Harrison and Peoria Sts., Chicago, Ill. 32 pages. This booklet lists specifications, descriptions, and prices of the firm's complete line of thermocouples and accessories. Two pages discuss the construction of thermocouples, and another page suggests methods for selecting the proper thermocouple. The concluding pages of the booklet contain thermocouple millivolt tables, wire resistance data, sizes of standard pipes and wires, etc.

"Selflube Porous Bearings." Keystone Carbon Co., Inc., Saint Marys, Pa. 23 pages. Products of powder metallurgy, Selflube bearings possess a homogeneous capillary structure providing innumerable pores which reserve the oil and feed it without drip to a continuous oil film on the bearing surface. This catalog presents the specifications and dimensions of these self-lubricating bearings, text and diagrams describing the proper methods of installation, and graphs showing the allowance for press fit into housing and the allowance for running fit after installation.

"The Tocol Line of Protective Coatings." Protective Coatings, Inc., 10391 Northlawn, Detroit, Mich. 45 pages. This illustrated booklet describes the Tocol Line of molded and seamless sheet rubber containers, industrial coatings, metal conditioners, building construction and maintenance specialties, synthetics, and other products. Rubber base paints for protection of wood, metals, and concrete against corrosion, abrasion, and moisture penetration; rust-inhibiting primers; an elastic oil-, grease-, and heat-resisting coating for rubber used as tire paint and gasket coating, and as a bonding material for combining two rubber or synthetic rubber surfaces; and other bonding and surfacing materials are included in the text which gives the purpose, method of application, and coverage figures.

"Blackout Paints." Bulletin No. 121, Binney & Smith Co., 41 E. 42nd St., New York, N. Y. 3 pages. This bulletin discusses exterior blackout paints for outer surfaces of windows and skylights which effectively eliminate transmission of light from within and reflection of light from the outside, and similar paints for interior application. Analyses of bituminous base, oleoresinous base, and natural resin spirit varnish base exterior paints; and the compositions of colloidal black dispersion types for emergency, temporary, and permanent paints for interior use are given.

"Industry Standard Die Sizes of Capping Stock and Camelback." The Rubber Manufacturers Association, 444 Madison Ave., New York, N. Y. In this chart standard die sizes are arranged in groupings to aid the tire retreader in selecting the proper die size for the matrix. Horizontally the groupings show dies having the same crown width, but increasing in bevel or wing width. The vertical columns show groups of sizes having the same bevel or wing, but increasing in crown and base width. A program of die standardization instituted in January, 1938, by camelback manufacturers reduced the number of die sizes from more than 2,300 to about 1,000 in 1941. A recently revised retreading industry program to permit the most efficient use of rubber has now eliminated the ⅛-inch shoulder bevel dies in favor of the ½-inch bevel dies. Beginning with dies having a gauge of $^{16}/_{32}$-inch, odd 32nd-inch gages such as $^{17}/_{32}$-inch, $^{19}/_{32}$-inch, $^{21}/_{32}$-inch, etc., have been dropped. It is believed the retreading industry will, under this plan, be able to operate efficiently with less than 500 die sizes. The new chart of standard camelback die sizes, effective December 1, 1941, conforms with the above decisions.

"O.P.M. Contract News." Jan. 2, 1942. Office of Production Management, Division of Contract Distribution, New York State Office, 122 E. 42nd St., New York, N. Y. 16 pages. The first issue of this weekly publication of the New York State Office of the Division of Contract Distribution describes the operation of this new department of the OPM which was organized to facilitate sub-contracting; give engineering, technical and other information; and assist small manufacturers to obtain war production contracts. A partial list of things currently sought by government buying agencies includes such information as the product, quantity, buying agency, closing date for bid, and invitation number. There are also advance notices of prospective government purchases and a list of army and navy buying agencies with addresses.

"Index to A.S.T.M. Standards Including Tentative Standards." American Society for Testing Materials, 260 S. Broad St., Philadelphia, Pa. Free on written request. 188 pages. The latest edition of this index, a valuable directory to the A.S.T.M. Book of Standards and its 1940 and 1941 supplements, lists all of the 1,043 standard specifications, test methods, and definitions covering engineering materials and subjects issued by the Society to December 1, 1941. All items are entered under appropriate key words according to subject, and there is also a list of the specifications and tests in numerical sequence of their serial designations.

"Milled Sponge Rubber." Catalog Section 9790. The B. F. Goodrich Co., Akron, O. 2 pages. Various grades of milled sponge rubber are described in this publication by textual matter and tabulated data. Widely used for sealing, cushioning, and absorbing vibration, milled sponge rubber, also called mechanical, chemical, or press-cured sponge to distinguish it from foam rubber, is commonly applied in gaskets, cushions, bumpers, bushings, etc.

"Rubber's Return to the Western Hemisphere." P. W. Litchfield. The Goodyear Tire & Rubber Co., Akron, O. 4 pages. This pamphlet surveys the recent progress toward rubber production in the New World through *Hevea* and guayule plantations, and the expansion of facilities for making synthetic rubber together with conservation of crude stocks and increased processing of reclaim. A report of Goodyear plantations in Panama and Costa Rica describes the development of two tracts with a combined area of 3,800 acres planted with high yielding stock from the Philippines.

"Lotol and Dispersite." Dispersions Process, Inc., Naugatuck Chemical Division of United States Rubber Co., 1230 Sixth Ave., New York, N. Y. 152 pages. This illustrated handbook, in loose leaf form, concerns the development of dispersed rubbers and the machinery and equipment for their handling. The material, grouped in seven sections for ready reference, includes descriptive matter on latex, Lotol (compounded latex), and Dispersites (water dispersions of crude and reclaimed rubber). A large flow chart accompanies the description of the production of Dispersite, and there is an informative article on the properties of aqueous rubber dispersions. Various engineering tables are provided. Supplementary material will be prepared by the manufacturer from time to time for convenient insertion in the permanent binder.

"Standard Industrial Classification Manual, Volume 1, Manufacturing Industries." Executive Office of the President, Bureau of the Budget, Washington, D. C. 1941. 99 pages. Price 15c. (Supplied by Superintendent of Documents, Washington, D. C.) This manual, a revision of the 1939 mimeographed edition, was developed to secure uniformity and comparability in the collection, tabulation, and presentation of statistical data by trade associations and private and governmental research agencies. Descriptions of all manufacturing industries including the rubber industry are given in a numerical code system, and an alphabetical index of products has the assigned code number of their industrial classification.

"Defense Is First at Firestone." Firestone Tire & Rubber Co., Akron, O. 20 pages. This illustrated folder describes various products developed and manufactured in nine Firestone plants in the United States and Canada for increased efficiency in combat, such as gas masks, barrage balloons, seadrome contact lighting buoys, aircraft tires and tubes bullet-sealing fuel tanks, non-explosive oxygen tanks, rubber tracks for army tanks, and inflatable boats and belts. The pamphlet reports a Firestone contract with the Defense Plant Corp. signed May 20, 1941, to construct a new synthetic rubber factory. Production will begin early in 1942, and as raw materials become available, capacity will be increased to 10,000 long tons a year.

"Inspected Electrical Equipment, Supplement to May, 1941, List." November, 1941. Underwriters' Laboratories, Inc., 207 E. Ohio St., Chicago, Ill. 99 pages. Indexed. The listed equipment has been tested for fire and accident risks and complies with the regulations of the National Electrical Code with regard to its installation and use. The list is revised semi-annually, and this booklet contains listings for appliances and parts examined to November 1, 1941.

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Amendment to M-13

(*Continued from page* 480)

or section of the same or any other enterprise owned or controlled by the same person.

(e) *Reports.* Reports shall be made by Producers at such times on such forms and with respect to such matters as shall be prescribed by the Chemicals Branch of the Office of Production Management. In addition, persons who order or receive Synthetic Rubber from a Producer shall furnish to the Chemicals Branch of the Office of Production Management information with respect to requirements and use of such material at such times and on such forms as the said Chemicals Branch shall prescribe. All persons shall furnish such other and further information as the Chemicals Branch may deem necessary for the orderly and effective operation of this Order.

(f) *Notification of Customers.* Producers shall, as soon as practicable, notify each of their regular customers of the requirements of this Order, but the failure to give such notice shall not excuse any person from the obligation of complying with the terms of this Order.

(g) *Violations or False Statements.* Any person who violates this Order, or who wilfully falsifies any records which he is required to keep by the terms of this Order, or by the Director of Priorities or otherwise wilfully furnishes false information to the Director of Priorities or to the Office of Production Management may be deprived of priorities assistance or may be prohibited by the Director of Priorities from obtaining further deliveries of materials subject to allocation. The Director of Priorities may also take any other action deemed appropriate, including the making of a recommendation for prosecution under Section 35(A) of the Criminal Code (18 U.S.C. 80).

(h) *Effective Date.* This Order shall take effect immediately and shall continue in effect until revoked by the Director of Priorities.

(P.D. Reg. 1, Aug. 27, 1941, 6 F.R. 4489; O.P.M. Reg. 3 Amended, Sept. 2, 1941, 6 F.R. 4865; E.O. 8629, Jan. 7, 1941, 6 F.R. 191; E.O. 8875; Aug. 28, 1941, 6 F.R. 4485; sec. 2(a), Public No. 671, 78th Congress, Third Session, as amended by Public No. 89, 77th Congress, First Session, sec. 9, Public No. 783, 76th Congress, Third Session.)

Issued this 31st day of December, 1941.

J. S. Knowlson,
Acting Director of Priorities.

Patents and Trade Marks

APPLICATION

United States

2,259,460. **Resilient Drive Bushing.** R. B. Dexter, Los Angeles, Calif.

2,259,488. **Catheter.** P. A. Raiche, North Providence, R. I., assignor to Davol Rubber Co., a corporation of R. I.

2,259,534. **Seat and Mattress Construction** of Sponge Rubber. A. T. Reynolds, Brooklyn, N. Y., and W. F. Todé, Radburn-Fairlawn, N. J.

2,259,776. **Resilient Wheel** Having Elastic Shear Elements Separating the Plates. E. H. Piron, assignor to Transit Research Corp., both of New York, N. Y.

2,259,940. **Pressure Fluid Sealing Gasket.** T. D. Nathan, Cuyahoga Falls, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,259,942. **Vibratory Screen** Utilizing a Pneumatic Tube. R. Stroud, assignor to Niagara Screens & Machines, Ltd., both of Toronto, Ont., Canada.

2,260,100. **Fountain Applicator.** D. V. Lisle, assignor to E. C. Deitrich, both of Pittsburgh, Pa.

2,260,133. **Ventilating Window** with Rubber Sealing Strip. A. P. Ball, assignor to Briggs Mfg. Co., both of Detroit, Mich.

2,260,193. **Non-Skid Tire.** M. C. Overman, assignor, by mesne assignments, to M. C. O. Corp., both of New York, N. Y.

2,260,238. **Railroad Tie Plate Arrangement.** T. W. Stedman, New York, N. Y.

2,260,246. **Underinflation and Overinflation Tire Signal** Having Rubber Parts. G. T. Woodruff and L. B. Jones, both of Decatur, Ala.

2,260,282. **Flexible Elastic Tube or Hose** Having a Coating of Polyvinyl Alcohol Resin. W. H. Grint, Trading Estate, Slough, England.

2,260,323. **Connector Plug** with Resilient Body. C. H. Judisch and A. Howarth, both of Providence, R. I., assignors to Whitney Blake Co., New Haven, Conn.

2,260,365. **Electrical Plug Connector** with Resilient Body. H. Charmoy, Long Island City, N. Y., assignor to Hatfield Wire & Cable Co., Hillside, N. J.

2,260,390. **Sponge Rubber Brush.** I. H. Lorenz, Arlington, Calif.

2,260,437. **Seat Cushion Structure** Using a Suction Cup Attachment Means. L. A. Chambers, St. Louis, Mo.

2,260,508. **Railway Truck Springing** Having a Longitudinal Elastic Torsion Member. I. M. Chambers, Narberth, Pa.

2,260,526. **Waterproof Elastic-Shirred Sleeve** for Canvas Breeches. J. J. Hodovan, Lorain, O.

2,260,532. **Shock Absorber** Including a Plurality of Transversely Disposed Rubber Pads and Transversely Curved Spring Plates. J. E. Lindeman, Evanston, assignor to W. H. Miner, Inc., Chicago, both in Ill.

2,260,573. **Indicia or Like Designs** Made Up of Layers of Acetate Material, Oil Paper, and a Soft Rubber Block. O. Lorch, New York, N. Y.

2,260,646. **Valve Stem** with Rubber Body Portion. M. A. Sorokin, Milford, assignor to Jenkins Bros., Bridgeport, both in Conn.

2,260,701. **Oronasal Mask.** W. M. Boothby, A. H. Bulbulian, and W. R. Lovelace, all of Rochester, Minn.

2,260,719. **Round Belt Construction** Having a Resilient Cushion Tube Surrounding the Inner Core. J. D. Merrifield, Rocky Ford, Colo.

2,260,787. **Gadget Holder** with Suction Cup Attaching Means. T. R. Nichols and C. J. Ringer, both of Emsworth, Pa.

2,260,905. **Wiper Blade Mounting.** E. C. Horton, Hamburg, assignor to Trico Products Corp., Buffalo, both in N. Y.

2,260,978. **Engine Support** with Rubber Disks. F. Klein and K. Eichholtz, assignors to Junkers Flugzeug-und-Motorenwerke, A. G., all of Dessau, Germany.

2,261,025. **Pneumatic Tire.** G. G. Havens, Detroit, Mich., assignor to United States Rubber Co., New York, N. Y.

2,261,038. **Window Panel Mounting** with a Rubber Retaining Strip. J. H. Sherts, Pittsburgh, assignor to Pittsburgh Plate Glass Co., Allegheny Co., both in Pa.

2,261,068. **Fish Lure** Comprising a Hollow Compressible Head Member Provided with Elongated Openings Arranged to Permit Passage of the Barbed End of the Hook Therethrough When the Head Member Is Compressed. J. J. Mackovich, Norwalk, Conn.

2,261,072. **Conductive Shoe.** L. J. Monahan, assignor to O'Donnell Shoe Co., both of Humboldt, Tenn.

2,261,081. **Inking Roller.** F. S. Beck, Clifton, N. J., assignor to Ben Day, Inc., New York, N. Y.

2,261,347. **Molding Device** Having an Intermediate Resilient Means Inserted between the Mold Sections and a Bearing Surface. E. G. L. Girard, Paris, France.

2,261,366. **Ice Skate Guard** Having Rubber Blocks. J. F. McGavock, assignor of ¼ to B. F. Mills, both of Beloit, Wis.

2,261,328. **Doll Head** Having Soft Rubber Ears. B. H. Baum, New York, N. Y.

2,261,409. **Hydraulic Shock Absorber** with Resilient Packing and Sealing Gasket. R. F. Peo, assignor to Houde Engineering Corp., both of Buffalo, N. Y.

2,261,466. **Food Casing** Comprising a Thin Membrane of Unvulcanized Rubber Modified by the Presence of a Wax (Paraffin, Ceresin, Beeswax, or Carnauba) to Render the Envelope Non-Tacky. E. E. Habib, Arlington, assignor to Dewey & Almy Chemical Co., North Cambridge, both in Mass.

2,261,475. **Squeegee.** W. E. Kautenberg, Freeport, Ill.

2,261,500. **Shower Head** of Soft Rubber. H. B. Lewis, Venice, and B. Burns, Santa Monica, both in Calif.

2,261,547. **Foundation Garment.** M. Goodman, and D. Lance, both of Brooklyn, assignors to Neatform Co., Inc., New York, all in N. Y.

2,261,595. **Incorporating Elastic Yarn** in Knitted Fabric. E. St. Pierre, Pawtucket, assignor to Hemphill Co., Central Falls, both in R. I.

2,261,609. **Curtain Guard.** P. R. Vass, Indianapolis, Ind.

2,261,768. **Rotary Agitator Back** of Rubber for a Suction Cleaner. L. M. Jones, assignor to Hoover Co., both of North Canton, O.

2,261,810. **Form-Fitting Slip** with Elastic Insert. H. Reiner, New York, N. Y.

2,261,833. **Rubber Valve Stem.** J. G. Kreyer, assignor to Firestone Tire & Rubber Co., both of Akron, O.

2,261,948. **Pipe Line Noise Eliminator** Consisting of Cushioning Tube Sleeves. R. H. Beach, Rockdale, Md., assignor to Gerotor May Co., a corporation of Del.

2,261,955. **Resilient Engine Mount.** K. A. Browne, Woodcliff Lake, N. J., assignor to Wright Aeronautical Corp., a corporation of N. Y.

2,262,017. **Elastic Strand** for Elastic Fabrics. S. C. Lilley, Hamden, Conn., assignor, by mesne assignments, to United Elastic Corp., Easthampton, Mass.

2,262,045. **Apparatus and Process to Treat Badminton Shuttlecocks.** D. H. Pollitt, Leaside, Ont., assignor to Pennsylvania Rubber Co., a corporation of Pa.

2,262,169. **Rubber Valve Stem.** J. C. Crowley, Cleveland Heights, O., assignor to Dill Mfg. Co., Cleveland, both in O.

2,262,394. **Insulation Jacket** for Linemen's Climbers. R. M. Evans, assignor to Surety Rubber Co., both of Carrollton, O.

2,262,443. **Roller Conveyer** Having Rubber Ring Parts. M. J. Anderson, assignor to Mathews Conveyer Co., both of Ellwood City, Pa.

2,262,518. **Rubber Heel** Having a Series of Spirals of Relatively Harder Material Extending from Top to Bottom and a Series of Longitudinally Spaced Irregularities in the Spirals. C. F. Stiel, St. Paul, Minn.

2,262,614. **Knitted Fabric** Incorporating an Elastic Yarn. R. H. Lawson, Pawtucket, assignor to Hemphill Co., Central Falls, both in R. I.

2,262,680. **Sandal.** C. E. Hosker, Watertown, Mass., assignor to B. F. Goodrich Co., New York, N. Y.

2,262,688. **Suspenders.** F. J. Lozo, Saskatoon, Sask., Canada.

2,262,780. **Inner Tire Casing** with Metal Body to Be Carried within a Tire Casing. A. Sherwood, Greenwich, Conn.

2,262,861. **Cable Covering** Composed of Filaments or Fibers of a Vinyl Resin (Polymerization Product of Vinyl Halide with Vinyl Ester of an Aliphatic Acid). E. W. Rugeley, T. A. Feild, Jr., and J. F. Conlon, all of Charleston, W. Va., assignors to Carbide & Carbon Chemicals Corp., a corporation of N. Y.

2,262,864. **Garment Supporter.** E. Sherlock and T. E. Near, both of Detroit, Mich.

2,262,933. **Toy Elevator** with Friction Wheel Carrying a Rubber Tire. I. S. Heinmiller, Menands, N. Y.

2,262,970. **Thermoplastic Box Toe** Having a Body of Fibrous Material Permeated with Rosin and a Minor Quantity of a Mixture of Copal and Rubber. H. Shrager and B. Shinberg, Lawrence, assignors to Atlas Shoe Products Corp., Lowell, both in Mass.

2,263,061. **Lamp Mounting** with Rubber Grommet. E. W. Allen, Birmingham, assignor to Yellow Truck & Coach Mfg. Co., Pontiac, both in Mich.

2,263,063. **Baggage Rack Head Cushion.** E. W. Allen, Birmingham, assignor to Yellow Truck & Coach Mfg. Co., Pontiac, both in Mich.

2,263,178. **Fluid Seal Assembly** Having an Extensible Resilient Sealing Member. J. A. Lignian and R. P. Koehring, both of Dayton, O., assignors to General Motors Corp., Detroit, Mich.

2,263,221. **Fuel Hose Nozzle,** of Rubber-Like Material and a Helix of Continuous, Electrically Conductive Wire Embedded therein along the Surface. A. B. Merrill, Akron, O., assignor of B. F. Goodrich Co., New York, N. Y.

2,263,249. **Light-Polarizing Laminated Glass** Bonded with Polyvinyl Alcohol and Having a Layer of Vinylic Resin Containing Oriented Molecules of Polyvinylene. H. G. Rogers, West Newton, Mass., assignor to Polaroid Corp., Dover, Del.

2,263,285. **Making a Transfer Roller** by Coating a Mandrel with a Binder, Slipping a Sleeve of Sponge Rubber on the Coated Mandrel, and Covering with Gelatin. F. Bolog, Detroit, Mich.

2,263,462. **Elastic Rubber Membrane** in a Backfire Relief Apparatus for an Engine Intake Conduit through Which a Compressible Fluid Passes. F. B. Hunter, Wyckoff, N. J., assignor to Wright Aeronautical Corp., a corporation of N. Y.

2,263,521. **Rubber Spring Arrangement.** G. H. Schieferstein, Berlin-Charlottenburg, Germany.

2,263,523. **Knitted Fabric** Incorporating Elastic Yarn. W. L. Smith, Jr., Pawtucket, assignor to Hemphill Co., Central Falls, both in R. I.

2,263,563. **Typewriter Platen.** M. Blum, Mankato, Minn.

2,263,599. **Friction Bolster Spring** with Rubber Block. H. E. Tucker, assignor to J. R. Cardwell, both of Chicago, Ill.

2,263,724. **Anti-Skid Tire.** G. Faulds, Philadelphia, Pa.

2,263,762. **Vacuum Cleaner** with Vibration Absorbing Bearing Mounting Having a Rubber Element Bonded to a Backing Plate. D. M. Dow, D. L. Boyd, and F. H. Burmeister, assignors to Air-Way Electric Appliance Corp., all of Toledo, O.

2,263,798. **Hot Water Bottle Stopper.** J. A. Clemens, Providence, R. I., assignor to Davol Rubber Co., a corporation of R. I.

2,263,806. **Rubber Weather Strip.** J. Hamerl, assignor to Packard Motor Car Co., both of Detroit, Mich.

2,263,813. **Screen** for Sliding Windows, Having Resilient Cushions on Two Opposite Edges of the Frame. R. E. Mason, New York, N. Y.

2,263,831. **Rubber Gasket** for Refrigerator Doors, Etc. A. Welch, assignor to Johnson Rubber Co., both of Middlefield, O.

2,263,868. **Wheel Arrangement** with Resilient Roller Bearing. R. Boyer, Paris, M. Marin, Neuilly-sur-Seine, and M. Gaestel, Arcueil, assignors to Société "Goodrich" S. A., société anonyme, Bois-Colombes, Seine, all in France.

2,263,884. **Resilient Railway Wheel** Utilizing Rubber Blocks. N. G. A. Malmquist, assignor to Svenska Aktiebolaget Bromsregulator, both of Malmo, Sweden.

2,263,895. **Resilient Floor.** B. V. Larsen, Charlottenlund, Denmark.

2,264,015. **Crutch** with Rubber-Lined Gripping Members. J. D. Bennett, Fulton, N. Y.

2,264,021. **Puncture-Sealing Inner Tube** Comprising an Annular Wall of Rubber, a Second Annular Wall Spaced from the First at the Crown Portion and Having Its Marginal Edges Secured to the First Wall, a Plastic Sealing Material between the Walls, and a Plurality of Spaced Circumferentially Extending Strips of Rubber Composition Arranged within the Plastic Material and Secured to the Inner of the Walls, the Strips Having Free Edges. E. Eger, Grosse Point Park, Mich., assignor to United States Rubber Co., New York, N. Y.

2,264,023. **Vehicle Suspension Mechanism** with Torsionally Yieldable Rubber Suspension Units. C. J. Faber, Detroit, assignor to Chrysler Corp., Highland Park, both in Mich.

2,264,069. **Stocking Top** Incorporating Elastic Yarn. A. N. Cloutier, Lonsdale, assignor to Hemphill Co., Central Falls, both in R. I.

2,264,147. **Machinery Packing Assembly** with Resilient Ring Parts. J. H. Dunlevy, assignor to Garlock Packing Co., both of Palmyra, N. Y.

2,264,148. **Machinery Packing** with Flexible Sealing Element. E. W. Fisher, Jr., and W. H. Gudinas, assignors to Garlock Packing Co., all of Palmyra, N. Y.

2,264,224. **Multi-Ply Launderable Collars, Cuffs, Etc.,** Comprising Fabric Bonded with a Thermoplastic Adhesive — Resin Polymer (Vinyl Chloride and Acetate), Ethyl Methyl Ketone, Tricresyl Phosphate, and Titanium Dioxide. T. H. Swan, Pittsburgh, Pa., assignor to Cluett, Peabody & Co., Inc., Troy, N. Y.

2,264,413. **Shaft Housing** with Resilient Sealing Member. W. Stegerist, St. Louis, Mo.

2,264,481. **Mail-Carrying Device** Utilizing Elas-

tic Bands. A. W. Peterson, Albert City, Iowa.

2,264,489. **Bottle Support.** D. W. Tiegler and E. Anglemyer, assignors to Western Rubber Co., all of Goshen, Ind.

2,264,591. **Woodwind Instrument Valve Pad** Having an Intermediate Layer of Soft Gum Rubber. E. Sander, assignor to H. & A. Selmer, Inc., both of Elkhart, Ind.

2,264,600. **Paraffin Scraping and Oil Saving Device** with Elastic Means Yieldably Mounted in the Well Rod Housing. P. O. Webb, Ada, assignor, by direct and mesne assignments, to G. E. Breeding, Oklahoma City, both in Okla.

2,264,631. **Paper Roll Dispenser** Utilizing a Blower Device Consisting of a Rubber Bag with Air Jet. I. H. Fetty, Los Angeles, Calif.

2,264,638. **Air Chuck** for Flush Valve Stems. O. H. Orr, assignor to General Tire & Rubber Co., both of Akron, O.

2,264,672. **Tub Cushion and Lining** Comprising Inflatable Rubber Cushions Having Suction Cups to Support the Lining on the Tub Walls. B. B. Levine, Pittsburgh, Pa.

2,264,739. **Oil Seal** Having an Elastic Ring. E. G. Boden, assignor to Timken Roller Bearing Co., both of Canton, O.

2,264,741. **Rubber Cup Packing.** A. L. Chamberlain, Cuyahoga Falls, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,264,750. **Upholstery Structure** Including a Body of Unimpregnated Fibrous Material Having a Skin Coating of Latex. J. A. Gordon, assignor to Allen Industries, Inc., both of Detroit, Mich.

2,264,767. **Tire Tread** with Ribs Stabilized against Lateral Tilting. C. F. Oliensend, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,264,930. **Helmet Insulating Lining** Having Resilient Shock Insulator Members. H. G. W. Chichester-Miles, London, England.

2,264,937. **Helmet Anticoncussion Pads** of Sponge Rubber and Hard Rubber. H. G. W. Chichester-Miles, London, England.

2,264,970. **Shaft Housing** with Flexible Sealing Element. L. E. Giles, New York, assignor to Garlock Packing Co., Palmyra, both in N. Y.

2,265,100. **Vibration Dampening Fitting** Utilizing a Tube of Elastic Material. C. M. Hamblin, Washington, D. C.

2,265,263. **Rubber Coated Coffin.** G. D. Brookins, Cleveland Heights, O.

2,265,266. **Squeegee.** O. E. Cote, Providence, R. I.

2,265,301. **Expansion Joints.** E. Meyer and G. J. Irwin, both of Akron, O., assignors to B. F. Goodrich Co., New York, N. Y.

2,265,341. **Air- and Gas-Tight Wall Lead-through** for Electric Wiring Systems, Particularly in High Altitude Aircraft, with Elastic Electrically Insulating Mass. F. Borchert, Berlin-Britz, assignor to Henschel Flugzeug-Werke A.G., Schonfeld, Kreis Teltow, both in Germany.

2,265,457. **Printing Roll Support and Pressure Mechanism.** S. B. Stafford, Oxford, and H. A. Smith, Holden, both in Mass., assignors to Rice Barton Corp., a corporation of Mass.

2,265,468. **Removable Tread** for Tires. A. F. Austin, Waterbury, Conn.

2,265,543. **Non-Skid Tire.** M. C. Overman, assignor, by mesne assignments, to M. C. O. Corp., both of New York, N. Y.

2,265,615. **Yieldable Sealing Means** for Coffee Brewers. W. T. Stalter, assignor to Western Rubber Co., both of Goshen, Ind.

2,265,649. **Rotary Knife** with Rubber Padding Interposed between the Blade and the Core. J. J. Krehbiel, Bridgeport, Conn.

2,265,693. **Refrigerator Cabinet Gasket.** J. L. Knight, Erie, Pa., assignor to General Electric Co., a corporation of N. Y.

2,265,712. **Advertising Device** Using Toy Figures of Soft Rubber, Etc. C. R. Wooten, New York, assignor to Beech-Nut Packing Co., Canajoharie, both in N. Y.

2,265,770. **Spongy, Sound-Deadening Material** Consisting of 12% Reclaimed Rubber, 50% Asphalt, 30% Wood Flour, and 8% Rosin. R. A. Crawford, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,265,804. **Washing and Cleansing Device** Having a Nozzle-Enclosing Porous Rubbing Element. I. A. Deady, Long Beach, N. Y.

Dominion of Canada

400,588. **Furniture Caster** Having a Wheel of Plastic Material Comprising a Core of Hard Material, a Soft Cushion Adjacent the Core, and a Floor-Engaging Portion Vulcanized to the Cushion. Bassick Co., Bridgeport, assignee of W. F. Herold, Easton, both in Conn., U. S. A.

400,625. **Mold Form** for Making Gypsum Base Molds, Having a Flask Rim of Hard Rubber. Castings Patent Corp., assignee of H. F. Hagemeyer, both of Chicago, Ill., U. S. A.

400,697 and 400,698. **Railway Car Hatch Plug** with Sealing Pads. Standard Railway Equipment Mfg. Co. (Canada), Ltd., Montreal, P. Q., assignee of C. D. Bonsall, Chicago, Ill., U. S. A.

400,700. **Railway Car Hatch Plug** with Compressible Padding. Standard Railway Equipment Mfg. Co. (Canada), Ltd., Montreal, P. Q., assignee of V. E. West, Chicago, Ill., U. S. A.

400,701. **Railway Car Hatch Plug Removable Sealing Pads.** Standard Railway Equipment Mfg. Co. (Canada), Ltd., Montreal, P. Q., assignee of K. E. Zeidler, Chicago, Ill., U. S. A.

400,703 and 400,704. **Railway Car Hatch Plug** with Compressible Pad. Standard Railway Equipment Mfg. Co. (Canada), Ltd., Montreal, P. Q., assignee of V. E. West, Chicago, Ill., U. S. A.

400,794. **Respirator.** American Optical Co. Southbridge, assignee of W. H. Lehnberg, Dudley, both in Mass., U. S. A.

400,835. **Gang Bolt** with Cushioning Disk Member. Deere & Co., assignee of E. F. Ohlendorf, both of Moline, Ill., U. S. A.

400,890. **Adhesive Tape** Comprising Porous Paper Impregnated with a Composition Consisting of Reclaimed Rubber about 45%, Crepe Rubber 5%, Inert Filler about 20%, Resinous Material Fluxed Therewith about 30%, All Dispersed in an Alkaline Volatile Vehicle in Which the Solids Constitute about 20 to 50%. Minnesota Mining & Mfg. Co., assignee of R. G. Drew, both of St. Paul, Minn., U. S. A.

400,895. **Vibrating Body Suspension Device.** M. F. A. Julien and Y. A. Rocard, co-inventors, both of Paris, France.

400,896 and 400,897. **Resilient Support.** M. F. A. Julien, Paris, France.

400,898. **Textile Goods Pressing Element** Having an Outer Moisture Impermeable Facing of Rubber. F. Schuster, Chemnitz, Germany.

400,929. **Vacuum Preventor** Having a Rubber Valve. V. W. Strode, Portland, Oreg., U. S. A.

400,931. **Sponge Rubber Whiskbroom.** J. Weil, Brooklyn, N. Y., U. S. A.

400,990. **Tire Tread** with Thin Ribs and Narrow Deep Grooves. General Tire & Rubber Co., assignee of H. T. Kratt, both of Akron, O., U. S. A.

400,992. **Expansion Joint.** B. F. Goodrich Co., New York, N. Y., assignee of E. Meyer and G. J. Irwin, co-inventors, both of Akron, O., all in the U. S. A.

400,993. **Overshoe.** B. F. Goodrich Co., New York, N. Y., U. S. A., assignee of P. Y. Smiley, Kitchener, Ont.

401,001. **Hydraulic Actuator** Having a Deformable Packing Ring. Kelsey-Hayes Wheel Co., Detroit, assignee of F. L. Main, Birmingham, both in Mich., U. S. A.

401,002. **Eyelash Curler** with Rubber Compressing Strip. Kurlash Co., Inc., Rochester, N. Y., assignee of S. L. Sneirson, Roxbury, Mass., both in the U. S. A.

401,030. **Filtering Apparatus** Having an Elastic Perforate Filtering Member. United States Rubber Co., New York, N. Y., U. S. A., assignee of Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of H. F. Jordan, Nutley, N. J., U. S. A.

United Kingdom

539,958. **Upholstery Articles.** International Latex Processes, Ltd.

539,966. **Packing Glands.** Dowty Equipment, Ltd., and A. E. Bingham.

540,000. **Closures** for Bottles and Like Containers. Peters Bros. Rubber Co., Inc.

540,137. **Resilient Couplings, Mounting Devices, Etc.** F. M. Guy and Guy & Merton, Inc.

540,427. **Windscreen Wiper.** J. A. Matthews.

540,429. **Detachable Rubber Wings** for Vehicles and Their Attachment thereto. Dunlop Rubber Co., Ltd. and S. Sadler.

PROCESS

United States

21,956. (Reissue.) **Retreading Tire Casings.** P. E. Hawkinson, assignor to Paul E. Hawkinson Co., both of Minneapolis, Minn.

2,262,776. **Open-Celled Gas Expanded Rubber.** D. Roberts, assignor to Rubatex Products, Inc., both of New York, N. Y.

2,263,015. **Manufacture of Thin, Flexible, Plastic Sheeting** Which Comprises Preparing a Cellulose Acetate Base, Forming a Composite Base by Coating with Cellulose Nitrate Sub-Coat, and Then Coating with a Solution of Solvent and Thermoplastic Adhesive Synthetic Vinyl Resin. P. C. Seel, assignor to Eastman Kodak Co., both of Rochester, N. Y.

2,263,612. **Elastic Yarn** with a Helically Wound Textile Cover. F. D. Chittenden, Rumford, R. I., assignor to United States Rubber Co., New York, N. Y.

2,263,614. **Balanced Single Cover Elastic Yarn.** A. Cote, Outremont, P. Q., Canada, assignor to United States Rubber Co., New York, N. Y.

2,263,931. **Vulcanized Crepe Rubber** Formed by Sheeting an Unvulcanized Mixture of Raw Rubber, Sulphur, Zinc Oxide, and an Accelerator, Partially Vulcanizing the Sheet, and Then Passing It between Differential Speed Rolls. B. C. Ross, Palmyra, N. J., assignor to R. T. Vanderbilt Co., Inc., New York, N. Y.

2,263,995. **Preparation of Purified Rubber** by Forming a Thin Film of Latex Free of Foreign Coagulating Agents, Drying It to Produce a Film Having a Thickness Less Than 35 Mils, and Promptly Immersing the Film in Water to Remove All the Water-Soluble Matter. A. R. Kemp, Westwood, N. J., and H. Peters, assignors to Bell Telephone Laboratories, Inc., both of New York, N. Y.

2,264,509. **Uniformly Plasticizing Rubber** by Placing Crude Rubber in a Pressure Chamber, and Maintaining for 30 Minutes to 6 Hours, a Pressure from 200-500 Pounds at 212° to 400° F. L. Cooper, New York, N. Y.

2,264,604. **Method of Making Golf Balls** Which Utilizes as a Winding Core a Solid Weighted Spherical Pellet Surrounded by a Solidified Fluid Which, after Winding, Is Made Fluid and Allowed to Escape through the Winding. Thus Automatically Centering the Weighted Pellet. L. A. Young, Detroit, Mich.

2,264,670. **Registering a Molded Rubber Printing Plate** on a Metal Backing Plate. J. J. Kessler, Chicago, Ill., assignor to United Autographic Register Co., a corporation of Ill.

2,265,436. **Manufacture of Articles from Vinyl Polymers** in a Continuous Production Unit Which Comprises Plastifying the Polymers on Heated Rollers; the Sheets Thus Obtained Entering an Extrusion Apparatus for Extrusion in the Desired Shape. F. Loblein, assignor to Deutsche Celluloidfabrik A. G., both of Eilenburg, Germany.

2,265,823. **Production of Sponge-Like Articles** from a Frothed Dispersion Which Comprises Treating the Mold Surface with a Stabilizer, Molding the Dispersion against the Treated Surface and Causing It to Become Set in Its Inner Region While the Stabilizer Locally Prevents It from Becoming Set. J. A. Talalay, Harpenden, Hertz, England.

MACHINERY

United States

21,967. (Reissue.) **Apparatus and Process for Handling Elastic Filaments.** F. J. Tobias, Ridgewood, N. Y., assignor to Filatex Corp., Trenton, N. J.

2,263,001. **Producing Tire Molds.** A. C. Gunsaulus, Akron, and M. Bean, Yellow Springs, both in O., assignors to Wingfoot Corp., Wilmington, Del.

2,263,131. **Apparatus for the Application of Adhesives to Rubber Insoles, Etc.** J. Hoza, Belcamp, Md.

2,263,278. **Strand Catcher** for Strand Winding Machine. F. M. Senns, North Dartmouth, Mass., assignor to United States Rubber Co., New York, N. Y.

2,263,791. **Tire Mold.** F. N. Winner, Denver, Colo.

2,264,154. **Form to Make Latex Articles.** A. N. Spanel, Dover, Del.

2,264,237. **Machine for Working Rubber, Etc.** F. E. Brown, Hyde, England.

2,265,346. **Apparatus for Shaping Hollow Distensible Structures.** R. W. Brown and H. D. Stevens, assignors to Firestone Tire & Rubber Co., all of Akron, O.

2,265,643. **Rotary Cutter.** R. R. Heath, Akron, Ohio.

2,265,749. **Pressing Apparatus.** H. D. Stevens, assignor to Firestone Tire & Rubber Co., both of Akron, O.

2,265,897. **Tire Balancer.** A. De Ghetto, Clifton, N. J., assignor to National Rubber Machinery Co., Akron, O.

Dominion of Canada

400,717. **Tire Building Machine.** United States Rubber Co., New York, N. Y., assignee of Gillette Rubber Co., assignee of A. C. Hirsch, J. F. Cullen, A. R. Krause, and H. O. Hutchens, co-inventors, all of Eau Claire, Wis., all in the U. S. A.

400,718. **Tire Casing Making Machine.** United States Rubber Co., New York, N. Y., assignee of Fisk Rubber Corp., Chicopee Falls, assignee of C. H. Desautels, Springfield, both in Mass., all in the U. S. A.

401,033. **Strand Coating Apparatus.** Western Electric Co., Inc., New York, N. Y., U. S. A.,

assignee of F. R. Reevely, Pointe Claire, P. Q.

401,035. **Strand Insulating Apparatus.** Western Electric Co., Inc., New York, N. Y., assignee of E. R. Troche and L. A. Vancura, both of Baltimore, Md., and I. N. R. Morgan, New York, N. Y., co-inventors, all in the U. S. A.

United Kingdom

540,341. **Mill** for Mixing Plastic Material. Firestone Tire & Rubber Co., Ltd.

540,510. **Apparatus and Process for Removing Adherent Coatings from Rigid Surfaces.** Dunlop Rubber Co., Ltd., D. F. Twiss, and F. A. Jones.

CHEMICAL

United States

2,262,997. **Precipitation of Polyvinyl Acetal Resins.** C. R. Fordyce, assignor to Eastman Kodak Co., both of Rochester, N. Y.

2,263,013. **Antioxidant**—Reaction Product of a Secondary Aromatic Amine and an N-Alkylol Amide at 130 to 300° C. W. Scott, Akron, O., assignor to Wingfoot Corp., Wilmington, Del.

2,263,014. **Preparation of Thiazoles.** W. Scott, Akron, O., assignor to Wingfoot Corp., Wilmington, Del.

2,263,305. **Adhesion of Rubber to Fibrous Materials** by Treating the Material with Poly 2,2,4-Trimethyl 1,2-Dihydro Quinoline, Associating It with Unvulcanized Rubber, and Then Vulcanizing. E. T. Lessig and I. Gazdik, both of Akron, O., assignors to B. F. Goodrich Co., New York, N. Y.

2,263,322. **Stable Aqueous Dispersion** of a Polymer of Chloro-2-Butadiene-1,3 Containing a Water-Soluble Betaine Having Both Emulsifying and Stabilizing Characteristics. H. W. Walker and F. N. Wilder, both of Woodstown, N. J., assignors to E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

2,263,447. **Latent Catalysts** (Benzoyl- or Phthaloyl-Mercaptobenzothiazoles) for Acid-Curing Thermosetting Resins. N. A. Shepard, Stamford, Conn., assignor to American Cyanamid Co., New York, N. Y.

2,264,025. **1-Cyanobutadiene-1,3.** Produced by Pyrolyzing the Reaction Product of Acetaldol and Anhydrous Hydrocyanic Acid. H. Gudgeon and R. Hill, both of Blackley, Manchester, England, assignors to Imperial Chemical Industries, Ltd., a corporation of Great Britain.

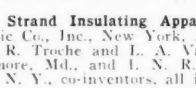
2,264,026. **1-Cyanobutadiene-1,3.** Produced by Heating an Ester of Crotonaldehydecyanohydrin to Thermal Decomposition Temperature. H. Gudgeon, Blackley, Manchester, England, assignor to Imperial Chemical Industries, Ltd., a corporation of Great Britain.

2,264,137. **Resinous Condensation Product**—Reaction Product of Organic Polycarboxylic Acid Compound and a Condensable, Polymerizable Polyhydroxymethylene Derivative of a Cyclic Amidine. K. Keller, Frankfort-on-the-Main-Fechenheim, assignor to I. G. Farbenindustrie A.G., Frankfort a.M., both in Germany.

2,264,291. **Polymeric Vinylidene Chloride Product** Having a Light-Stabilizing Agent (2,2'-Dihydroxy-Benzophenone or 2,4'-Dihydroxy-Benzophenone). R. F. Boyer, L. A. Matheson, and C. L. Moyle, assignors to Dow Chemical Co., all of Midland, Mich.

2,264,625. **Polymerized Vinyl Ester Resin and a Solvent therefor** (Isophorone or Di-Hydroisophorone). A. K. Doolittle, South Charleston, W. Va., assignor to Carbide & Carbon Chemicals Corp., a corporation of N. Y.

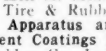
2,264,757. **Organic Vulcanizing Agent** Containing the Structure



Wherein *n* Is One of the Integers 3 and 4 and the Adjoining Carbon Atoms Do Not Constitute Part of Another Ring Structure. P. C. Jones, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,264,758. **Vulcanization of Rubber** in the Presence of an Accelerator Characterized by the

Group and a Thioamine Having



the Structural Formula R—S—R' Wherein

R and *R'* Are Members of the Class Consisting of Secondary and Tertiary Amino Groups and *x* Is One of the Integers 1, 2, 3, and 4. P. C. Jones, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,264,759. **Preparation of Amino Aliphatic Hydrogen Sulphates.** P. C. Jones, Akron, O., assignor to B. F. Goodrich Co., New York.

2,264,811. **Polymerization of Conjugated Butadiene to Drying Polymers.** H. S. Rothrock, assignor to E. I. du Pont de Nemours & Co., Inc., both of Wilmington, Del.

2,264,870. **Vulcanization of Rubber** in the Presence of a Thiazole Accelerator and an Isothiohydantoin as an Activator. D. J. Beaver, Nitro, W. Va., assignor to Monsanto Chemical Co., St. Louis, Mo.

2,265,286. **Preparation of Vinyl Halides** Which Comprises Reacting Acetylene and a Hydrogen Halide in the Vapor Phase in the Presence of a Catalyst (Solid Complex Salt of a Mercuric Halide and an Alkaline Earth Metal Halide). A. B. Japs, Cuyahoga Falls, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,265,299. **Manufacture of 1,1' Dithio Bis Aryl-Thiazoles.** W. E. Messer, Cheshire, Conn., assignor to United States Rubber Co., New York, N. Y.

2,265,319. **Manufacture of Dithio-Bis-Thiazoles.** M. G. Shepard, Waterbury, and W. E. Messer, Cheshire, both in Conn., assignors to United States Rubber Co., New York, N. Y.

2,265,324. **Imparting to Rubber at Least Some of the Physical Properties of Vulcanized Rubber** Which Comprises Heating an Aqueous Dispersion of Rubber, in the Absence of Oxygen, with Potassium, Ferricyanide, Ferric Chloride, or Mercuric Chloride. D. Spence, Monterey, Calif., assignor to B. F. Goodrich Co., New York, N. Y.

2,265,347. **Preparation of Dithiazyl Disulphides.** E. L. Carr, assignor to Firestone Tire & Rubber Co., both of Akron, O.

2,265,364. **Artificial Dispersion of Rubber** Stable in the Presence of Zinc Oxide and Containing a Morpholine Soap. D. E. Fowler, Naugatuck, and J. F. Zemaitis, Waterbury, both in Conn., assignors, by mesne assignments, to Dispersions Process, Inc., New York, N. Y.

2,265,509. **Vinyl Chloride** Produced By Leading Acetylene and Hydrogen Chloride over Active Carbon and Supplying Metallic Mercury to the Reactants. J. Boesler and E. Eberhardt, both of Ludwigshafen-on-the-Rhine, W. Sandhass, Mannheim, and R. Stadler, Heidelberg, assignors to I. G. Farbenindustrie, A.G., Frankfort a.M., all in Germany.

2,265,639. **Printing Ink** Having a Vehicle Comprising a Thermoprene and Heat-Liquefied Rubber. D. B. Forman, Fairlawn, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,265,640. **Copolymers of Vinyl Compounds and Unsaturated Allyl Esters and Ethers.** B. S. Garvey, Akron, and C. H. Alexander, Cuyahoga Falls, both in O., assignors to B. F. Goodrich Co., New York, N. Y.

2,265,641. **Production of Butadiene** by Dehydrogenation of Butylene Which Consists in Leading a Gaseous Mixture of Normal Butylene with Steam at Temperatures between 500 and 700° C. over a Catalyst Containing More Than 50% of Zinc Oxide and Also at Least One Other Oxide (Chromium, Vanadium, Molybdenum, Uranium or Tungsten). O. Grosskinsky, Schkopau, and N. Roh and G. Hoffman, both of Ludwigshafen-on-the-Rhine, all in Germany, assignors, by mesne assignments, to Jasco, Inc., a corporation of La.

2,265,776. **Composition** Comprising an External Phase Consisting of Balata and an Internal Phase, Distributed therethrough, Consisting of Discrete Particles of a Vulcanized Soft Rubber Powder Directly Derived from Latex. J. A. Merrill, Akron, O., assignor to Wingfoot Corp., Wilmington, Del.

2,265,777. **Dispersing Rubber in a Rubber Non-Solvent** by Flocculating Natural Rubber Latex by the Addition of an Acidic Salt and Progressively Replacing the Latex Serum with the Non-Solvent. J. A. Merrill, Akron, O., assignor to Wingfoot Corp., Wilmington, Del.

Dominion of Canada

400,837. **Plasticized Polystyrene Composition** Free of All Traces of Reagents or By-products Other Than Hydrocarbons. Distillers Co., Ltd., Edinburgh, Scotland, assignee of H. M. Stanley, Tadworth, Surrey, England.

400,982. **Molding Composition** Which Comprises a Polyhydric Alcoholic Polyester of an Olefin Alpha-Beta Dicarboxylic Acid and an Alpha Substituted Ethylene Compound (Esters of Vinyl Alcohol, Acrylic and Methacrylic Acids, or Styrene and Vinyl Ketones). Ellis-Foster Co., assignee of C. Ellis, both of Montclair, N. J., U. S. A.

401,056. **Esters of 2-Oxybutadiene-1,3—Reaction Product of Monovinyl Acetylene and a Carboxylic Acid.** Dr. Alexander Wacker Gesellschaft fur Elektrochemische Industrie, G.m.b.H., Munich, assignee of H. Berg and A. von Putzer Reybegg, co-inventors, both of Burghausen, all in Germany.

United Kingdom

540,004. **Aliphatic Dicarboxylic Acids.** Shell Development Co.

540,049. **Synthetic Compositions of Matter.** Standard Oil Development Co.

540,089. **Zinc Soaps** of Cocoanut Oils. United States Rubber Co.

540,102. **Copolymers of Styrene and Products Thereof.** A. Abbey, (Dow Chemical Co.).

540,256. **Vinyl Resin Compositions.** Carbide & Carbon Chemical Corp.

540,442. **Synthetic Resin Adhesives or Cements.** N. A. de Bruyne, C. A. A. Rayner, Aero Research, Ltd., and De Havilland Aircraft Co., Ltd.

UNCLASSIFIED

United States

2,263,118. **Apparatus for Pelleting Carbon Black.** S. C. Carney, Bartlesville, Okla., assignor to Phillips Petroleum Co., a corporation of Del.

2,263,638. **Hydraulic Expander and Applicator** for Short Elastic Tubes. B. S. Minor, San Pedro, assignor to Bettis Rubber Co., Ltd., Los Angeles, both in Calif.

2,263,691. **Tire Mounting Device** for Rollers. W. P. Bradley, Cratton, Pa., assignor to National Tube Co., a corporation of N. J.

2,264,425. **Adhesive Tape Dispenser.** L. L. Witter, Auburndale, Mass.

2,264,663. **Tire Removing Equipment.** E. A. Glynn, Lodi, Calif., assignor to Super Mold Corp. of Calif., a corporation of Calif.

2,264,639. **Recap Tire Balancer.** C. L. Peterson, Cheyenne, Wyo.

2,264,815. **Hose Coupling.** A. Thomson, Akron, Ohio.

2,265,241. **Wheel Assembly** Having a Tire Tube Expansion Area to Eliminate Pinching of a Tire Tube. G. A. Lyon, Allenhurst, N. J.

Dominion of Canada

400,987. **Disk Wheel.** Firestone Tire & Rubber Co., assignee of W. S. Brink, both of Akron, O., U. S. A.

400,988. **Vehicle Wheel.** Firestone Tire & Rubber Co., assignee of W. S. Brink, both of Akron, O.

401,018. **Circular Knitting Machine** with Rubber Yarn Feeding Means. Scott & Williams, Inc., Laconia, assignee of R. H. Lawson, Lakeport, both in N. H., U. S. A.

401,037. **Tire Tube Valve.** Wingfoot Corp., Wilmington, Del., assignee of B. C. Eberhard, Akron, O., and S. T. Williams, Bellerose, N. Y., all in the U. S. A.

401,038. **Tire Valve** for a Plural-Chambered Tube. Wingfoot Corp., Wilmington, Del., assignee of B. C. Eberhard, Akron, O., both in the U. S. A.

TRADE MARKS

United States

391,140. **Cardolite.** Rubber substitutes, etc., from cashew nut shell, liquid, etc. Harvel Corp., Irvington, N. J.

391,146. **Micaphane.** Crib sheets. United States Rubber Co., New York, N. Y.

391,147. **J. S. Staedtler.** Stationer's supplies, including erasers, etc. J. S. Staedtler, Nuremburg, Germany.

391,272. **Pyrosec.** Wires and cables. United States Rubber Co., New York, N. Y.

391,324. **Sandal Swade.** Suede-like surfaced fabrics. Hood Rubber Co., Inc., Wilmington, Del.

391,341. **Alice Carol.** Clothing. Mutual Buying Syndicate, Inc., New York, N. Y.

391,344. **Grace Lee.** Clothing. Plymouth Wholesale Dry Goods Corp., New York, N. Y.

391,447. **Trianon.** Prophylactics. Gotham Sales Co., Inc., doing business as Universal Merchandise Co., New York, N. Y.

391,460. **Bona-kleen.** Sidewall tire cleaner and preservative. Bona-Kleen Co., Los Angeles, Calif.

391,475. **Mould-Ezie.** Shoes. Daly Bros. Shoe Co., Inc., Boston, Mass.

391,484. **Betterfine.** Clothing, including shoes. Bloomingdale Bros., Inc., New York, N. Y.

391,489. **Foamtred.** Footwear. Welleo Shoe Corp., Waynesville, N. C.

391,495. **Doubletex.** Shoe linings. Acme Backing Corp., New York, N. Y.

391,497. **Permasheen.** Waterproofed or rubberized fabrics for nursery equipment. I. B. Kleinert Rubber Co., New York, N. Y.

391,498. **Zip.** Erasers. American Lead Pencil Co., Hoboken, N. J.

391,511. **Grand.** Nurser nipples and caps. General Health Corp., Philadelphia, Pa.

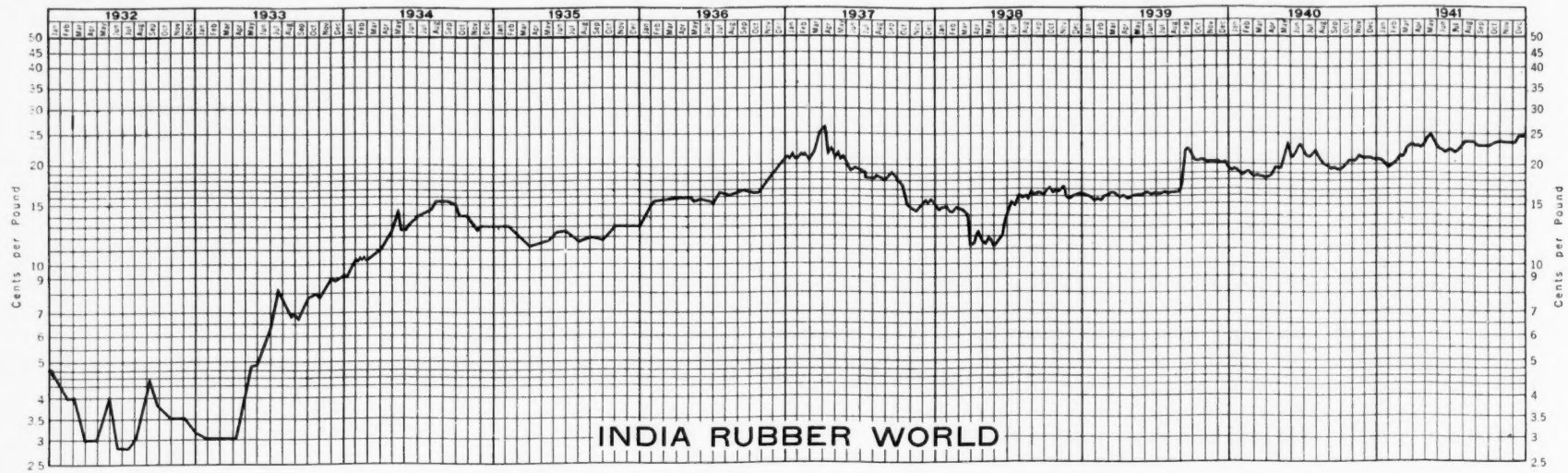
391,520. **Dual "8"** Tires. General Tire & Rubber Co., Akron, O.

391,522. **Highway.** Tires. General Tire & Rubber Co., Akron, O.

New York Outside Market—Low and High Spot Rubber Prices in Cents per Pound—1933-1941

		January	February	March	April	May	June	July	August	September	October	November	December
1933,	No. 1 thin latex crepe	3 3/8/ 3 7/8	3 5/8/ 3 13/16	3 5/8/ 3 7/8	3 3/4/ 5	5 5/16/ 6 7/8	5 7/8/ 7 5/8	7 3/8/10 1/2	7 1/2/ 8 3/4	7 1/2/ 9 7/8	7 3/4/ 8 7/8	8 1/4/10 5/8	9 7/8/10 1/4
	Ribbed smoked sheet	2 15/16/ 3 1/4	2 7/8/ 3	2 15/16/ 3 5/16	2 15/16/ 4 1/4	4 5/16/ 6 3/8	5 1/4/ 6 7/8	6 1/2/ 9 3/4	6 5/8 /7 7/8	6 5/8/ 8 1/4	6 7/8/ 8	7 3/4/ 9 3/8	8 1/2/ 9 7/8
	Upriver fine	6 / 6 3/4	6 /.....	6 /.....	6 / 6 1/2	6 3/4/ 8 3/4	7 1/2/ 8 1/2	8 3/4/11	9 3/4/11	8 3/4/ 9 3/4	8 / 9 1/4	8 / 9	9 /.....
1934,	No. 1 thin latex crepe	10 3/4/11 3/4	11 1/4/12 1/4	11 7/8/13 1/4	13 1/8/15 3/4	11 /17 3/8	14 3/4/16	15 7/8/16 5/8	16 1/4/17 1/8	15 3/4/16 3/4	13 3/4/15 1/2	13 3/8/14 3/4	13 1/4/13 7/8
	No. 1 ribbed smoked sheet	8 3/4/10 3/8	9 1/2/10 3/4	10 7/8/11 5/8	11 1/4/13 5/8	12 /15 1/8	12 3/4/14 7/8	13 1/8/14 7/8	14 1/8/15 3/4	14 3/4/15 7/8	13 /14 1/2	12 7/8/13 3/8	12 3/4/13 1/2
	Upriver fine	8 3/4/ 9	9 / 9 3/4	9 1/4/10 1/4	10 1/4/11	11 /13 1/2	11 /12	11 1/4/12	11 1/2/11 3/4	10 3/4/11 3/4	10 /10 3/4	9 3/4/10	9 1/2/ 9 3/4
1935,	No. 1 thin latex crepe	12 3/4/14 1/8	13 /13 3/4	10 5/8/12 7/8	10 7/8/12 1/4	11 5/8/13	12 1/4/13 1/16	11 13/16/12 3/4	11 13/16/12 3/8	11 1/2/12 1/4	12 /13 3/4	13 1/16/13 1/8	13 5/8/13 1/8
	No. 1 ribbed smoked sheet	12 3/8/13 1/2	12 1/16/13 3/8	10 3/8/12 1/16	10 1/8/12	11 3/8/12 3/4	12 1/16/12 1/2	11 3/4/12 7/16	11 3/8/12 1/4	11 1/4/12	11 3/4/13 1/2	12 1/8/13 3/8	12 3/4/13 7/16
	Upriver fine	9 3/4/ 9 3/4	9 1/2/ 9 3/4	9 / 9 1/2	8 3/4/ 9 1/2	9 3/4/ 9 7/8	9 1/2/10 1/2	9 1/4/10	9 3/4/10 1/4	9 7/8/10 1/2	10 1/2/12 1/4	12 /13 1/2	12 /13 1/2
1936,	No. 1 thin latex crepe	13 7/8/15 1/16	15 1/16/16 1/16	16 1/16/16 1/16	16 1/16/16 7/16	15 5/8/16 7/16	15 13/16/16 1/2	16 5/16/17 1/16	16 1/4/16 13/16	16 3/16/17 1/4	16 13/16/17 1/8	17 3/4/19 1/16	19 1/4/24 1/8
	No. 1 ribbed smoked sheet	13 1/2/15 1/16	15 1/16/15 3/4	15 3/4/16 1/16	15 11/16/16 7/8	15 1/16/15 11/16	15 5/8/16 1/16	16 1/16/16 3/4	16 1/8/16 7/16	16 1/4/16 5/8	16 7/16/17 1/16	17 1/8/18 7/16	18 1/2/23
	Upriver fine	12 /13	13 /16 1/2	15 3/4/16 3/4	16 3/4/18 3/4	17 1/2/18 1/2	17 1/4/17 1/2	17 1/2/17 7/8	17 7/8/20 1/2	20 1/2/21	20 1/2/21 1/2	21 1/2/23 3/4	23 1/2/25 1/4
1937,	No. 1 thin latex crepe	21 11/16/23 1/2	22 1/8/24 1/2	24 1/16/31	24 7/8/31 1/2	25 /26 1/2	22 1/4/25 5/8	20 /22 5/8	19 1/4/20	18 1/2/20 5/16	15 1/2/18 3/4	14 1/2/16	14 13/16/15 13/16
	No. 1 ribbed smoked sheet	20 9/16/22 3/8	20 13/16/21 7/8	21 1/2/26 7/8	20 7/8/26 7/8	20 3/8/22 1/2	18 1/2/20 7/16	18 7/16/19 5/8	18 7/16/18 11/16	17 1/2/19 1/16	14 3/4/17 3/4	14 /15 5/16	14 1/2/15 7/16
	Upriver fine	24 /25	25 /.....	22 /25	22 /22 3/4	22 /22 3/4	20 /22	20 /20 1/4	19 1/2/20 1/4	19 1/2/19 3/4	16 1/2/19 3/4	14 1/2/16 1/2	15 /15 1/4
1938,	No. 1 thin latex crepe	14 7/16/15 5/8	14 3/4/15 3/4	11 7/8/15 1/2	11 7/8/13 7/8	12 1/8/13 7/8	12 3/8/15 1/16	15 5/8/17	16 7/16/17 3/8	16 5/8/17 3/8	17 7/16/18 1/8	16 7/16/18 1/4	16 7/8/17 5/8
	No. 1 ribbed smoked sheet	14 1/16/15 7/16	14 1/16/15	10 1/4/13 7/8	10 7/8/12 3/4	11 7/8/12 1/16	11 1/4/14 1/16	14 3/4/16 1/4	15 1/16/16 7/16	15 7/16/16 7/8	16 5/8/17 7/16	15 7/16/17 1/4	15 7/8/16 5/8
	Upriver fine	14 1/4/15	12 3/4/14 1/4	10 3/4/12 3/4	10 3/4/11	11 /11 3/4	11 1/4/13 3/4	13 3/4/15	15 /15 3/4	15 3/4/.....	15 3/8/15 3/4	15 1/2/.....	14 1/8/15 1/2
1939,	No. 1 thin latex crepe	15 7/16/17 7/16	15 7/16/18 1/16	17 /18 1/16	17 /17 7/8	17 7/16/18 3/8	18 /18 5/16	18 5/8/18 7/16	18 /18 7/16	21 /26	21 1/2/23 3/4	22 1/2/23 3/4	20 1/2/23
	No. 1 ribbed smoked sheet	15 7/8/16 1/8	15 3/8/16 3/4	15 7/8/16 1/2	15 3/4/16 1/16	15 13/16/16 1/2	16 1/16/16 5/8	16 5/16/16 7/8	16 5/16/16 7/8	19 1/2/25	20 1/4/21 1/2	20 1/4/20 3/4	19 3/4/20 1/4
	Upriver fine	13 7/8/14 1/8	13 1/8/13 5/8	13 5/8/13 3/4	13 5/8/.....	13 5/8/14 1/4	14 1/4/14 3/8	14 3/4/.....	14 3/4/14 3/8	14 3/8/.....	...../.....	...../.....	18 3/4/.....
1940,	No. 1 thin latex crepe	19 1/2/20 3/4	18 7/8/20	18 3/4/19 3/8	18 3/4/20	19 3/4/25	20 1/2/23 1/2	21 /22 3/4	19 /21 3/4	19 3/4/19 5/8	19 3/8/19 5/8	19 3/4/20 3/4	20 5/8/21 1/2
	No. 1-X ribbed smoked sheet	19 /19 5/8	18 3/8/19 1/4	18 1/4/18 7/8	18 3/4/20	19 1/4/25	20 1/2/23 1/2	21 /22 1/4	19 1/4/20 3/4	19 3/8/19 3/4	19 3/4/20 3/4	20 5/8/21 1/2	20 5/8/21
	Upriver fine	18 1/4/18 3/4	17 7/8/18 1/4	17 3/8/17 7/8	17 3/8/17 3/4	17 3/4/21 7/8	19 3/8/21 3/8	19 3/8/19 7/8	18 7/8/19 1/8	17 7/8/18 3/8	15 7/8/16 7/8	16 7/8/17 3/8	17 5/8/17 7/8
1941,	No. 1 thin latex crepe	19 3/8/20 3/4	19 5/8/21 1/2	21 7/8/23 1/2	22 7/8/24 1/8	23 5/8/26	22 7/8/23 3/4	22 7/8/24 3/8	24 3/8/24 1/2	24 1/8/24 3/8	23 9/16 †/24 3/4	23 9/16 †/.....	23 9/16 †/.....
	No. 1-X ribbed smoked sheet	19 3/8/20 3/4	19 5/8/21 1/2	21 /23	22 1/4/23 1/2	22 1/4/25	21 1/8/22 1/2	21 1/2/22 3/4	23 1/8/23 1/4	22 1/4/23 1/8	22 1/2 /23 1/4	23 1/4 /23 3/8 ‡	23 1/4 /24 1/2 ‡
	Upriver fine	16 3/4/17 5/8	17 /17 7/8	17 7/8/22 1/4	22 1/4/30	28 /34	*	26 /28	28 /32	30 /32	29 /30	29 /30	23 1/4 /24 1/2

*Not quoted for June until June 27, at which time price was 26¢. †Government prices. ‡Free rubber prices.



New York Outside Market—Closing Prices Ribbed Smoked Sheets—1932-1941

Market Reviews

CRUDE RUBBER

Commodity Exchange

TABULATED WEEK-END CLOSING PRICES ON THE NEW YORK MARKET

Futures	Nov. 29	Dec. 27	Jan. 3	Jan. 10	Jan. 17	Jan. 24
Mar.	22.35	22.50	22.50	22.50	22.50	22.50
Volume per week (tons)..	50	80	.....	.....	.....	.....

MARCH futures were quoted at 22.50¢ per pound through January, and 42 open contracts on December 31 were decreased to 27 contracts by the last day of January. As trading in free rubber was suspended, effective February 2, the manner in which the 27 contracts will be liquidated will have to be determined by interested parties.

Exports of crude rubber from producing countries (except Thailand and French Indo-China) participating in the restriction scheme were 120,683 long tons in October, 1941, the International Rubber Regulation Committe reported, in comparison with the revised September figure of 130,575 long tons. The October exports were 29,217 long tons below the permissible quota of 149,900 long tons. The Commodity Exchange, Inc., estimated world stocks at 905,138 long tons on October 31, 1941, an increase of 30,221 long tons over September 30. Major increases were said to be in United States stocks and in those of Singapore and Penang dealers. World absorption of crude in October was estimated at 112,918 long tons, against 108,155 long tons in September.

Producing areas others than the Far East have announced that production will be increased to aid in meeting the demands of the United States and her allies.

The International Rubber Regulation Committee has announced discontinuance of its *Statistical Bulletin* with the December, 1941, issue, owing to conditions beyond its control. Publication will be resumed as soon as possible.

New York Outside Market

As we go to press, it is learned that trading in free rubber will be discontinued, effective February 2, and thereafter all dealings in rubber will be made according to regulations of the Rubber Reserve Co. During January activity in the actual market was generally dull. Some dealers were reported to be seeking contacts in South America, and Brazil has indicated that more rubber could be obtained from Amazon forests if the price was attractive. No. 1-X ribbed smoked sheets closed at 24½¢ per pound January 2, fell to 24¼¢ per pound on January 7, where it remained until February 2.

Fixed Government Prices*

Plantation Grades

	Price Per Lb. Dec. 26-Jan. 29
No. 1-X R.S.S. in cases†	$0.22½
No. 1 Thin Latex Crepe	.23
No. 2 Thick Latex Crepe	.23
No. 1 Brown Crepe	.21⅜
No. 2 Brown Crepe	.21
No. 2 Amber	.21⅜
No. 3 Amber	.21
Rolled Brown	‡

* For a complete list of government prices see our October 1, 1941, issue, p. 58. ‡ Rolled Brown, however was 17⅛¢ from Dec. 26-Jan. 12 and 17⅛¢ from Jan. 13-Jan. 29. † Free rubber on New York Outside Market: Dec. 26-Jan. 6, 24½¢; Jan. 7-Jan. 29, 24¼¢.

New York Outside Market Rubber Quotations

Latex	Jan. 28, 1940	Dec. 29, 1941	Jan. 27, 1942
	(Dollars and Cents)		
Normal and concentrated (solid content) ....*lb.*	.2373/.24	.2825/.295	.2825/.295
Paras			
Upriver fine....*lb*	.16½	.32½	.39
Upriver fine....*lb*	*.19¼	*.37	*.45½
Upriver coarse.*lb*	.11	.17	.20
Upriver coarse.*lb*	*.17	*.23	*.38
Islands fine....*lb*	.16½	.31	.37
Islands fine....*lb.*	*.19	*.36	*.46
Acre, Bolivian fine .....*lb.*	.16¾	.33	.39
Acre, Bolivian fine .....*lb.*	*.19½	*.37	*.47
Beni, Bolivian fine .....*lb.*	.17¾	.34	.39
Madeira fine...*lb*	.16½	.32½	.38½
Caucho			
Upper ball.....*lb*	.11	.17	.20
Upper ball.....*lb.*	*.17	*.23	*.38
Lower ball.....*lb.*	.10½	.16	.19
Pontianak			
Pressed block..*lb.*	.15/.27	....	....
Guayule			
Ampar .....*lb*	.15½	....	....
Africans			
Rio Nuñez ..*lb.*	.18½	.20	.20
Black Kassai...*lb.*	.19	.20	.20
Prime Niger flake .....*lb.*	.22½	.28	.28
Gutta Percha			
Gutta Siak ....*lb.*	.16¾-.17¼	....	....
Gutta Soh .....*lb.*	.26	....	....
Red Macassar..*lb.*	1.20	1.50	1.50
Balata			
Block Ciudad Bolivar .....*lb.*	.42	....	....
Manaos block..*lb.*	.45	....	....
Surinam sheets.*lb.*	.54	....	....
Amber .....*lb.*	.56	....	....

* Washed and dried crepe. Shipments from Brazil.

RECLAIMED RUBBER

JANUARY demands for reclaim continued very active from all consuming branches of the industry except tire factories. Production has remained at capacity levels. Manufacturers are experimenting extensively with the use of reclaimed rubber in many of their products, and some companies are reported to be making certain items entirely from reclaim. No restrictions on reclaim consumption have been made as yet.

Prices are unchanged at established ceilings.

New York Quotations

January 26, 1942

Auto Tire	Sp. Grav.	¢ per lb.
Black Select	1.16-1.18	6½/ 6¾
Acid	1.18-1.22	7½/ 7¾
Shoe		
Standard	1.56-1.60	7 / 7¼
Tubes		
Black	1.14-1.26	11¼/11½
Gray	1.15-1.26	12½/13¼
Red	1.15-1.30	12 /12½
Miscellaneous		
Mechanical blends	1.25-1.50	4½/ 5½
White.....	1.35-1.50	13¼/14½

The above list includes those items or classes only that determine the price bases of all derivative reclaim grades. Every manufacturer produces a variety of special reclaims in each general group separately featuring characteristic properties of quality, workability, and gravity at special prices.

RUBBER SCRAP

THE government goal for 1942 scrap rubber collection is said to be 500,000 tons, with the national salvage campaign expected to add materially to supplies. January demands have somewhat increased over those of last month, and all sources of collection are being intensively canvassed by dealers. The implication of the tire rationing and rubber conservation programs with respect to scrap rubber is a slower movement of discarded products into collection channels. The prices quoted here are the same as last month, but as we go to press, it is believed that ceiling prices will be announced shortly.

Consumers Buying Prices

(Carlot Lots for January 2, 1942)

Boots and Shoes		Prices
Boots and shoes, black.....	*lb.*	$0.01½/$0.01⅝
Colored	*lb.*	.01¾/ .01⅞
Untrimmed arctics	*lb.*	.01¼/ .01⅜
Inner Tubes		
No. 1, floating	*lb.*	.12 / .14
No. 2, compound	*lb.*	.07¾/ .08
Red	*lb.*	.07¾/ .08
Mixed tubes	*lb.*	.06⅜/ .06⅝
Tires (Akron District)		
Pneumatic Standard		
Mixed auto tires with beads	*ton*	17.00/ 18.00
Beadless	*ton*	24.50 /25.00
Auto tire carcass	*ton*	55.00 /57.50
Black auto peelings.....	*ton*	54.00 /55.00
Solid		
Clean mixed truck	*ton*	43.00 /46.00
Light gravity	*ton*	50.00 /52.00
Mechanicals		
Mixed black scrap.....	*ton*	31.00 /32.00
Hose, air brake	*ton*	32.00 /34.00
Garden, rubber covered..	*ton*	12.00 /14.00
Steam and water, soft...	*ton*	12.00 /14.00
No. 1 red.....	*lb.*	.05 / .05¼
No. 2 red.....	*lb.*	.03½/ .04
White druggists' sundries...	*lb.*	.04¾/ .05
Mixed mechanicals	*lb.*	.02½/ .02¾
White mechanicals	*lb.*	.04¾/ .05
Hard Rubber		
No. 1 hard rubber.....	*lb.*	.16 / .17

COMPOUNDING INGREDIENTS

EARLY results of rubber rationing were reflected in the compounding ingredients market by a decreased demand for some materials. Demand for others held to previous high levels. Movements were chiefly to war industries, and usually large; but offerings of some materials were limited. Slight price increases were noted for some products.

CARBON BLACK. Production continued at a rate sufficient to meet anticipated demands. Smaller demands were believed to result in part from large orders by consumers prior to January 1 price increases. To what extent the effect of tire restriction may be offset by war production and increased use of black in compounds to conserve rubber has not been determined. Prices are unchanged.

CLAY. The kaolin and ball clay industry in the United States produced 1,050,000 short tons of clay in 1939, value $7,214,000, the Bureau of the Census reported. Demand continued good. Prices are firm.

DRY COLORS. The OPA announced that previous agreements with manufacturers stabilizing dry color prices have been extended to March 31. The demand for colors by the rubber industry decreased because of the restrictions on the use of rubber for products in which colors are used. Prices are unchanged.

FACTICE OR RUBBER SUBSTITUTE. The OPM advised manufacturers on December 31, 1941, that they could purchase and consume rapeseed oil for the manufacture of synthetic rubber-like materials if no practical substitute was available, but at no greater rate than average 1941 consumption. Amendment No. 2 to General Imports Order M-63 (OPM) issued and effective January 13 added rapeseed and palm oils to the materials under import control. The Defense Supplies Corp. and the Metals Reserve Co. were designated as the sole authorized purchasers. Demand for rubber substitutes was heavy. Prices are from ¼¢ to ½¢ higher for some materials.

LITHARGE. The demand continued heavy, and shipments were in good volume. Price advances of ¾¢ per pound were reported.

LITHOPONE. The demand was heavy, but the supply was somewhat tight. Titanated lithopone advanced 35 points to 5.60¢ per pound in bags in carload lots. Prices are firm.

RUBBER CHEMICALS. Demand for latex chemicals in general decreased perceptibly because of the reduced availability of latex, and there was a slight decrease in demand for other rubber chemicals in comparison with that of the last few months. Prices are steady.

RUBBER SOLVENTS. With heavy movements to war industries, the demand held to substantial levels. Prices are firm.

TITANIUM PIGMENTS. OPA on January 2 requested makers of titanium pigments to keep prices at October 1, 1941, levels. Amendment No. 2 to General Preference Order M-44 (OPM) issued January 7 revised the procedure governing purchasers' certificates, adjusted regulations governing allocations to seasonal users, and relieved producers of titanated lithopone from the necessity of setting aside a portion of their production for the required reserve. Demand decreased. Prices are unchanged.

ZINC OXIDE. Supplementary Order M-11-g (OPM), issued January 2, ordered resumption of the zinc oxide pool, with January requirements set at 10% of October, 1941, production, and increased the metallic zinc pool from 29 to 31% of October, 1941, production. General Preference Order M-11 (OPM) controlling distribution of zinc and zinc oxides was extended to March 31. A government program for increasing output of lead and zinc by 30% was announced January 14 by the OPA. Premium prices, substantially higher than existing ceilings, of 11¢ per pound for zinc and 9¼¢ per pound for lead for tonnage in excess of quotas are assured for 2½ years beginning February 1. The demand for zinc oxide continued unabated at December levels. Prices are steady.

Current Quotations*

Abrasives

Pumicestone, powdered	lb.	$0.035 $0.04
Rottenstone, domestic	lb.	.025

Accelerators, Inorganic

Lime, hydrated, *l.c.l.*, New York	ton	25.00
Litharge (commercial)	lb.	.09
Magnesia, calcined, heavy	lb.	
technical, light	lb.	.0625/ .07

Accelerators, Organic

A-1	lb.	.26 / .35
A-10	lb.	.36 / .42
A-19	lb.	.52 / .65
A-32	lb.	.60 / .70
A-77	lb.	.42 / .55
A-100	lb.	.42 / .55
Accelerator 49	lb.	
531	lb.	.48 / .50
737	lb.	.42 / .43
737-50	lb.	.25 / .26
808	lb.	.70 / .72
833	lb.	1.15
Acrin	lb.	.60
Aldehyde ammonia	lb.	.65 / .70
Altax	lb.	.55 / .60
B-I-F	lb.	.50 / .55
Beutene	lb.	.70 / .75
Butyl Eight	lb.	.98 / 1.00
C-P-B	lb.	2.00
Captax	lb.	.50
Crylene	lb.	
Paste	lb.	
D-B-A	lb.	2.00
Delac A	lb.	.40 / .50
O	lb.	.40 / .50
P	lb.	.40 / .50
Di-Esterex-N	lb.	.60 / .70
DOTG (Di-ortho-tolyguanidine)	lb.	
DPG (Diphenylguanidine)	lb.	
El-Sixty	lb.	.50 / .65
Ethylideneaniline	lb.	.42 / .43
Formaldehyde P.A.C	lb.	.06 / .0625
Formaldehyde-para-toluidine	lb.	.57 / .59
Formaniline	lb.	.36 / .37
Guantal	lb.	.40 / .50
Hepteen	lb.	.35 / .40
Base	lb.	1.35 / 1.50
Hexamethylenetetramine U.S.P.	lb.	.39
Technical	lb.	.33
Lead oleate, No. 999	lb.	.145
Witco	lb.	.15
Ledate	lb.	1.50
Monex	lb.	1.55
Novex	lb.	
O-X-A-F	lb.	.50 / .55
Oxynone	lb.	.77 / .90
Para-nitroso-dimethylaniline	lb.	.85
Pentex	lb.	$0.75 /$0.85
Flour	lb.	.125 / .135
O	lb.	
Flour	lb.	
Phenex	lb.	.50 / .55
Pip-Pip	lb.	1.65
R & H 50-D	lb.	.42 / .43
Rotax	lb.	.60 / .65
Safex	lb.	1.20 / 1.30
Santocure	lb.	.80 / 1.00
Selenac	lb.	2.00
SPDX	lb.	.70 / .75
A	lb.	.70 / .75
Super sulphur No. 2	lb.	.14 / .16
Tetrone A	lb.	2.20
Thiocarbanilide	lb.	.28 / .33
Thionex	lb.	1.55
Thiurad	lb.	1.55
Trimene	lb.	.55 / .65
Base	lb.	1.05 / 1.20
Triphenylguanidine (TPG)	lb.	.45
Tuads, Methyl	lb.	1.55
2-MT	lb.	.75
Ulto	lb.	1.00 / 1.05
Ureka	lb.	.60 / .75
Blend B	lb.	.60 / .75
C	lb.	.56 / .65
Vulcanex	lb	.42 / .43
Vulcanol	lb.	.85
Z-B-X	lb.	2.50
Zenite	lb.	.46 / 48
A	lb.	.53 / .55
B	lb.	.46 / .48
Zimate, Butyl	lb.	1.15
Ethyl	lb.	1.15
Methyl	lb.	1.25
Zipacel	lb.	1.90

Activators

Aero Ac 50	lb.	
Barak	lb.	.50
MODX	lb.	.30 / .35
SL No. 20	lb.	.085 / .10

Age Resisters

AgeRite Alba	lb.	2.00
Gel	lb.	.57 / .59
Hipar	lb	.65 / .67
Powder	lb.	.52 / .54
Resin	lb.	.52 / .54
D	lb.	.52 / .54
White	lb.	1.25 / 1.40
Akroflex C	lb.	.56 / .58
Albasan	lb.	.70 / .75
Aminox	lb.	.52 / .61
Antox	lb.	.56
Betanox	lb.	.52 / .61
Special	lb.	.65 / .74
B-L-E	lb.	.52 / .61
Powder	lb.	.65 / .74
B-X-A	lb.	.52 / .61
Copper Inhibitor X-872-A	lb.	1.15
Flectol H	lb.	.52 / .65
White	lb.	.90 / 1.15
M-U-F	lb.	1.50
Neozone (standard)	lb.	.63
A	lb.	.52 / .54
B	lb.	.63
C	lb.	.52 / .54
D	lb.	.52 / .54
E	lb.	.63
Oxynone	lb.	.77 / .90
Parazone	lb.	.68
Permalux	lb.	1.20
Santoflex B	lb.	.52 / .65
BX	lb.	.58 / .71
Santovar A	lb.	1.15 / 1.40
Solux	lb.	1.30
Stabilite	lb.	.52 / .54
Alba	lb.	.70 / .75
Thermoflex	lb.	1.20 / 1.15
A	lb.	.65 / .67
Tysonite	lb.	.16 / .165
V-G-B	lb.	.52 / .61

Alkalies

Caustic soda, flake, Columbia (400-*lb. drums*)	100 lbs.	2.70 / 3.55
liquid, 50%	100 lbs.	1.95
solid (700-*lb. drums*)	100 lbs.	2.30 / 3.15

Antiscorch Materials

A-F-B	lb.	.35 / .40
Antiscorch T	lb.	.90
Cumar RH	lb.	.105
E-S-E-N	lb.	.35 / .40
R-17 Resin (*drums*)	lb.	.1075
RM	lb.	1.25
Retarder W	lb.	.36
Retardex	lb.	.45 / .48
U-T-B	lb.	.35 / .40

Antisun Materials

Heliozone	lb.	.23 / .24
S.C.R.	lb.	.33 / .35
Sunproof	lb.	.23 / .28
Jr.	lb.	.165 / .215

Blowing Agents

Ammonium Carbonate, lumps (500-*lb. drums*)	lb.	
Unicel	lb.	.50

Brake Lining Saturant

B.R.T. No. 3	lb.	.0175/ .0185

*Prices in general are f.o.b. works. Range indicates grade or quantity variations. Space limitation prevents listing of known ingredients. Requests for information not recorded will receive prompt attention.

Colors

Black

Du Pont powder	lb.	$0.42 /$0.44
Lampblack (commercial), l.c.l.	lb.	.15

Blue

Du Pont Dispersed	lb.	.83 / 3.95
Powders	lb.	2.25 / 3.75
Heliogen BKA	lb.	
Toners	lb.	

Brown

Mapico	lb.	.11

Green

Chrome	lb.	.25
oxide (*freight allowed*)	lb.	.24
Du Pont Dispersed	lb.	.98 / 2.85
Powders	lb.	1.00 / 5.50
Guignet's (*bbls.*)	lb.	.70
Toners	lb.	

Orange

Du Pont Dispersed	lb.	.88 / 2.00
Powders	lb.	.88 / 2.75
Toners	lb.	

Orchid

Toners	lb.	

Pink

Toners	lb.	

Purple

Toners	lb.	

Red

Antimony Crimson, 15/17%	lb.	
R. M. P. No. 3	lb.	.48
Sulphur free R.M.P.	lb.	.52
Golden 15/17%	lb.	
7-A	lb.	.37
Z-2	lb.	.25
Cadmium, light (400-lb. *bbls.*)	lb	.80 / .85
Du Pont Dispersed	lb.	.93 / 2.05
Powders	lb.	.30 / 1.65
Iron Oxide, *l.c.l.*	lb.	
Mapico	lb.	.0975
Rub-Er-Red (*bbls.*)	lb.	.0975
Toners	lb.	

White

Lithopone (*bags*)	lb.	.0425 /.045
Albalith	lb.	.0425/ .045
Astrolith (50-lb. *bags*)	lb.	.0425/ .045
Azolith	lb.	.0425/ .045
Titanium Pigments		
Ray-bar	lb.	.055 / .065
Ray-cal	lb.	.0525/ .0625
Rayox	lb.	.135 / .165
Titanolith (50-lb. *bags*)	lb.	.056 / .0585
Titanox-A	lb.	.145 / .175
B	lb.	.0575/ .0625
30	lb.	.0575/ .0625
C	lb.	.055 / .06
M	lb.	.0575/ .0625
RC	lb.	.055 / .06
RC-HT	lb.	.055 / .06
Ti-Tone	lb.	
Zopaque (50-lb. *bags*)	lb.	.16 / .165
Zinc Oxide		
Azo ZZZ-11	lb.	.0725/ .075
44	lb.	.0725/ .075
55	lb.	.0725/ .075
66	lb.	.095 / .0975
French Process, Florence		
Green Seal-8	lb.	.09 / .0925
Red Seal-9	lb.	.085 / .0875
White Seal-7	lb.	.095 / .0975
Kadox, Black Label-15	lb.	.0725/ .075
No. 25	lb.	.085 / .0875
72	lb.	.0725/ .075
Red Label-17	lb.	.0725/ .075
Horse Head Special 3	lb.	.0725/ .075
XX Red-4	lb.	.0725/ .075
23	lb.	.0725/ .075
72	lb.	.0725/ .075
78	lb.	.0725/ .075
80	lb.	.0725/ .075
103	lb.	.0725/ .075
110	lb	.0725/ .075
St. Joe (lead free)		
Black Label	lb.	.0725/ .075
Green Label	lb.	.0725/ .075
Red Label	lb.	.0725/ .075
U.S.P	lb.	.105 / .1075
Zinc Sulphide Pigments		
Cryptone-BA-19	lb.	.056 / .0585
BT	lb.	.056 / .0585
CB	lb.	.056 / .0585
MS	lb.	.0575/ .06
ZS No. 20	lb.	.0825/ .085
86	lb.	.0825/ .085
230	lb.	.0825/ .085
800	lb.	.0825/ .085
Sunolith	lb.	.0425/ .045

Yellow

Cadmolith (cadmium yellow), (400-lb. *bbls.*)	lb.	.55 / .60
Du Pont Dispersed	lb.	1.25 / 1.75
Powders	lb.	.16 / 1.75
Mapico	lb.	.$0.0725
Toners	lb.	

Dispersing Agents

Bardex	lb.	.0425/$0.045
Bardol	lb.	.025 / .0275
B	lb.	.05 / .0525
Darvan No. 1	lb.	.30 / .34
No. 2	lb.	.30 / .34
Nevoil (*drums, c.l.*)	lb.	.0225
Santomerse S	lb.	.11 / .25

Fillers, Inert

Asbestine, *c.l.*	ton	15.00
Asbestos Fiber	ton	15.50 /44.00
Barytes	ton	40.00
f.o.b., St. Louis (50-lb. *paper bags*)	ton	25.55
off color, domestic	ton	29.00
white, domestic	ton	38.50
Blanc fixe, dry, precip.	lb.	.065
Calcene	ton	37.50 /43.00
Infusorial earth	lb.	.0225
Kalite No. 1	ton	26.00
3	ton	36.00
Kalvan	ton	100.00
Magnesium Carbonate, *l.c.l.*	lb.	.0725/ .1125
Paradene No. 2 (*drums*)	lb.	.0525
Pyrax A	ton	7.50
Whiting		
Columbia Filler	ton	9.00 /14.00
Suprex White	ton	32.50
Witco, *c.l.*	ton	8.00

Finishes

Black-Out (surface protective)	gal.	4.50 / 5.00
Mica, *l.c.l.*	ton	
Rubber lacquer, clear	gal.	1.00 / 2.00
colored	gal.	2.00 / 3.50
Shoe Varnish	gal.	1.45
Talc	ton	25.00

Flock

Cotton flock, dark	lb.	.09 / .11
dyed	lb.	.40 / .80
white	lb.	.12 / .20
Rayon flock, colored	lb.	1.00 / 1.50
white	lb.	.75 / 1.00

Latex Compounding Ingredients

Accelerator 85	lb.	.35
89	lb.	1.20
122	lb.	1.30
552	lb.	1.90
Aerosol OT Aqueous 10%	lb.	
Antox, dispersed	lb.	.42
Aquarex D	lb.	.75
F	lb.	.85
Areskap No. 50	lb.	.18 / .24
100, dry	lb.	.39 / .51
Aresket No. 240	lb.	.16 / .22
300, dry	lb.	.42 / .50
Aresklene No. 375	lb.	.35 / .50
400, dry	lb.	.51 / .65
Black No. 25, dispersed	lb.	.22 / .40
Casein	lb.	
Collocarb	lb.	.07
Color Pastes, dispersed	lb.	.38 / 1.90
Copper Inhibitor X-872	lb.	2.25
Dispersex No. 15	lb.	.11 / .12
No. 20	lb.	.08 / .10
Factex Dispersion A	lb.	.165
Heliozone, dispersed	lb.	.25
Latac	lb.	2.50
MICRONEX, Colloidal	lb.	.06 / 07
Pipsol X	lb.	3.05 / 3.55
R-2 Crystals	lb.	2.50 / 2.75
RN-2 Crystals	lb.	1.90 / 2.15
S-1 (400-lb. *drums*)	lb.	.65
Santobrite Briquettes	lb.	
Powder	lb.	
Santomerse D	lb.	.41 / .65
S	lb.	.11 / .25
Sodium Stearate	lb.	.34 / .375
Stablex A	lb.	.90 / 1.10
B	lb.	.65 / .90
C	lb.	.40 / .50
Sulphur, dispersed	lb.	.10 / .15
No. 2	lb.	.08 / .12
T-1 (440-lb. *drums*)	lb.	.40
Tepidone	lb.	.63
Zenite Special	lb.	.55
Zinc oxide, dispersed	lb.	.12 / .15

Mineral Rubber

Black Diamond, *l.c.*	ton	25.00 /27.00
B.R.C. No. 20	lb.	.0105/ .0115
Gilsonite	ton	
Parmr	ton	25.00 /29.00
Pioneer, *c.l.*	lb.	25.00 /27.00
285°-300°	ton	25.00 /27.00

Mold Lubricants

Aluminum Stearate	lb.	.21 / .24
Aquarex D	lb.	.75
WA Paste	lb.	.25
Colite	gal.	.90 / 1.15
Lubrex	lb.	.25 / .30
Mold Paste	lb.	.12 / .30
Rubber-Glo, conc. regular	gal.	.94 / 1.15
Type W	gal.	.99 / 1.20
Sericite	ton	65.00
Soapstone, *l.c.l.*	ton	22.50
Zinc Stearate	lb.	.28 / .30

Oil Resistant

A-X-F	lb.	$0.82 /$0.85

Reclaiming Oils

B.R.V	lb.	.035 / .0375
No. 1621	lb.	.021 / .0235
S.R.O.	lb.	.02 / .0225
X-159	gal.	.20 / .32

Reenforcers

Carbon Black		
Aerfloted Arrow Specification (*bags only*)	lb.	.0355†
Arrow Compact Granulized	lb.	.0355†
Certified Heavy Compressed (*bags only*)	lb.	.0355†
Spheron	lb.	.0355†
Continental, dustless	lb.	.0355†
Compressed (*bags only*)	lb.	.0355†
Disperso	lb.	.0355†
Dixie	lb.	.0355†
Dixiedensed	lb.	.0355†
66	lb.	.0355†
Furnex	lb.	.035
Beads	lb.	.035
Gastex	lb.	.035 / .06
HX	lb.	.0355†
Kosmobile	lb.	.0355†
66	lb.	.0355†
Kosmos	lb.	.0355†
Dixie 20	lb.	.035†
MICRONEX Beads	lb.	.0355†
Mark II	lb.	.0355
Standard	lb.	.0355
W-5	lb.	.0355
W-6	lb.	.0355
P-33	lb.	.0475
Pelletex	lb.	.035 / .06
Thermax	lb.	.0225
TX	lb.	.0355†
Velvetex	lb.	.04 / .06
"WYEX BLACK"	lb.	.0355†
Carbonex Flakes	lb.	.03 / .035
S	lb.	.031 / .036
Plastic	lb.	.031 / .0335
Clays		
Aerfloted Hi-White	ton	11.00 /
LGB	ton	15.00
Paragon (50-lb. *bags*)	ton	10.00
Suprex (50-lb. *bags*)	ton	11.00 /23.50
Barden	ton	10.00
Catalpo, *c.l.*	ton	30.00
Chicora	ton	10.00
China	ton	25.00
Crown	ton	11.00
Dixie	ton	11.00
"L"	ton	
Langford	ton	8.50
McNamee	ton	10.00
Par	ton	11.00
Paraforce, *c.l.*	ton	50.00
Witco, *c.l.*	ton	10.00
Cumar EX	lb.	.05
MH	lb.	.065 / .115
V	lb.	.095 / .125
Silene	lb.	.04 / .045

Reodorants

Amora A	lb.	
B	lb.	
C	lb.	
D	lb.	
Curodex 19	lb.	
188	lb.	
198	lb.	
Rodo No. 0	lb.	4.00 / 4.50
10	lb.	5.00 / 5.50

Rubber Substitutes

Black	lb.	.085 / .13
Brown	lb.	.085 / .1375
White	lb.	.09 / .15
Factice		
Amberex Type B	lb.	.1875
Brown	lb.	.0875/ .155
Fac-Cel B	lb.	.155
C	lb.	.155
Neophax A	lb.	.14
B	lb.	.14
White	lb.	.09 / .155

Softeners and Plasticizers

B.R.T. No. 7	lb.	.02 / .021
Bondogen	lb.	.98 / 1.05
Burgundy pitch	lb.	
Copene Resin	lb.	.32
Cycline oil	gal.	.14 / .20
Dipolymer Oil	gal.	.33 / .38
Dispersing Oil No. 10	lb.	.0375/ .04
Nevinol	lb.	.13 / .14
Nuba resinous pitch (*drums*)		
Grades No. 1 and No. 2	lb.	.029
3-X	lb.	.0425
Nypene Resin	lb.	.32
Palm oil (Witco), *c.l.*	lb.	
Palmol	lb.	.15

†Price quoted is f.o.b. works (bags). The price f.o.b. works (bulk) is $0.033 per pound. All prices are carlot.

Para Flux	gal.	$0.09 /$0.18
No. 2016	gal.	.125 / .20
Para Lube	lb.	.0425/ .048
Piccolyte Resin	lb.	.15 / .185
Pine tar	gal.	
Oil	gal.	
Plastogen	lb.	.0775/ .08
Plastone	lb.	.27 / .30
R-19 Resin (*drums*)	lb.	.1075
21 Resin (*drums*)	lb.	.1075
Reogen	lb.	.115 / .12
RPA No. 1	lb.	.65
2	lb.	.65
3	lb.	.46
4	lb.	.80
Tackol	lb.	.085 / .18
Tonox	lb.	.52 / .61
Tonox D	lb.	.75 / .85
Witco No. 20, *l.c.l.*	gal.	.20
X-1 resinous oil (*tank car*)	lb.	.011

Softeners for Hard Rubber Compounding

Resin C Pitch 45° C. M.P.	lb.	.015 / .016
60°C. M.P.	lb.	.015 / .016
75°C. M.P.	lb.	.015 / .016

Solvents

Beta-Trichlorethane	lb.	.20
Carbon Bisulphide	lb.	
Tetrachloride	gal.	
Cosol No. 1	gal.	.26
No. 2	gal.	.25
No. 3	gal.	.22
Industrial 90% benzol (*tank car*)	gal.	.15
Skellysolve	gal.	

Stabilizers for Cure

Barium Stearate	lb.	.27 / .30
Calcium Stearate	lb.	.23 / .27
Laurex (*bags*)	lb.	.15 / .175
Lead Stearate	lb.	
Magnesium Stearate	lb.	.29 / .32
Stearex B	lb.	.1425/ .1525
Beads	lb.	.1375/ .1475
Stearic acid, single pressed	lb.	.1425/ .1525
Stearite, *c.l.*	lb.	.1375
Zinc Laurate	lb.	.29 / .32
Stearate	lb.	.28 / .31

Synthetic Rubber

Hycar O. R.	lb.	.70 / 1.00
Neoprene Type CG	lb.	.70
E	lb.	.65
FR	lb.	.75
G	lb.	.70
GN	lb.	.65
I	lb.	.70
KN	lb.	.75
M	lb.	.65
Neoprene Latex Type 56	lb.	.30
57	lb.	.30
Synthetic 100	lb.	.41
"Thiokol" Type "A"	lb.	.35 / .45
"F"	lb.	.45 / .55
"FA"	lb.	.50 / .60
"RD"	lb.	.70

Tackifier

B.R.H. No. 2	lb.	.02 / .021

Vulcanizing Ingredients

Magnesia, light (for neoprene)	lb.	.25 / .26
Sulphur	100 lbs.	
Chloride (*drums*)	lb.	.04
Telloy	lb.	1.75
Vandex	lb.	1.75
(See also Colors—Antimony)		

Waxes

736 (clear)	gal.	1.25
737 (black)	gal.	1.35
1515-A (black)	gal.	1.35
Carnauba, No. 3 chalky	lb.	
2 N.C.	lb.	
3 N.C.	lb.	
1 Yellow	lb.	
2	lb.	
Carnube	lb.	.46 / .56
Monten	lb.	.12 / .17
Rubber Wax No. 118, Neutral	gal.	.60 / 1.15
Colors	gal.	.70 / 1.25

Rubber Base Protective Coatings

Primoid rubber base coatings, resistant to gasoline, oils, water, brine, alcohol, acids, and other chemicals are said to prevent corrosion and rusting of metals and to seal leaks through concrete, stucco, and brick masonry, and plaster and wood. Four types for various purposes are produced by Primoid Products Corp.

LEGAL

Carbon Black Decision Reversed

The Fourth United States Circuit Court of Appeals at Charlotte, N. C., on January 6 reversed the decision on February 17, 1941, of the District Court at Charleston whereby the United Carbon Co., Charleston, was found not guilty of infringement of the Wiegand-Venuto patent for producing free-flowing, dustless carbon black pellets, as charged in a suit instituted by Binney & Smith Co., New York, N. Y. The patent covers the pelleted carbon black process and also the process making it, but only the claims relating to the pelleted product were involved.

In the former case the presiding judge dismissed the suit on the ground that the plaintiff had no cause for action, and the judge held that there were recognizable differences between the product described in the plaintiff's patent and the defendant's product relative to degree of porosity and purity and degree of uniformity in size.

The Court of Appeals concluded, however, that "the patentees had made a substantial contribution to an important art by solving a problem which had baffled other technological experts who had addressed themselves to it"; that the patent in suit is a "pioneer patent as applied to the particular art; and its claims are entitled to a liberal construction", and that, therefore, the "product claims sued on are valid and infringed by the product of Defendants."

LETTERS FROM OUR READERS

EDITOR: The seriousness of the rubber situation suggests the employment of all agencies to economize with rubber wherever possible.

One extravagant use is the rubber tread of tires for which an abrasion-resistant compound is used that necessitates a large amount of first-class gum.

In times of emergencies as today it may be necessary to find a fairly suitable substitute for the heaviest wearing part of the tire.

It is herewith suggested to fall back upon a tread which to my knowledge was extensively used in Europe.

It consisted of a chrome-tanned leather strip studded with hardened steelpins about ½" in diameter and extruding ⅜". This band was cold cured upon the tire carcass and was renewed when the steel pins were worn off.

On dirt or icy roads these tires gave quite satisfactory service. Many old tires could be reclaimed for service in this way.

Sincerely,
HANS PFLEUMER.

New York, New York,
January 9, 1942.

Tire Production Statistics

	Pneumatic Casings		
	Inventory	Production	Shipments
1939	8,664,505	57,612,731	57,508,775
1940	9,126,528	59,186,423	58,774,437
1941	4,416,640	61,532,656	66,162,707
1941			
Jan.	9,797,253	5,486,296	4,849,748
Feb.	10,028,803	5,161,267	4,896,340
Mar.	10,148,861	5,685,559	5,517,255
Apr.	9,957,849	5,839,332	5,999,262
May	8,373,324	6,091,395	7,675,828
June	7,087,737	6,378,844	7,601,993
July	6,234,749	5,577,805	6,449,606
Aug.	5,834,109	4,983,424	5,394,340
Sept.	5,154,081	4,562,972	5,259,225
Oct.	4,122,836	4,834,308	5,867,175
Nov.	4,042,995	3,964,067	4,047,913
Dec.	4,416,640	2,967,387	2,604,022

	Pneumatic Casings		
	Original Equipment	Replacement Sales	Export Sales
1939	18,207,556	38,022,034	1,279,185
1940	22,252,869	35,345,656	1,175,912
1941	24,778,505	39,900,058	1,484,144
1941			
Jan.	2,291,209	2,424,730	133,809
Feb.	2,546,120	2,203,297	146,923
Mar.	2,638,066	2,728,557	150,632
Apr.	2,332,427	3,534,323	132,512
May	2,698,799	4,830,449	146,580
June	2,595,259	4,861,281	145,453
July	1,998,436	4,313,042	138,128
Aug.	1,122,227	4,142,407	129,706
Sept.	1,469,223	3,664,310	125,692
Oct.	1,994,383	3,756,963	115,829
Nov.	1,803,558	2,161,845	82,510
Dec.	1,288,798	1,278,854	36,370

	Inner Tubes		
	Inventory	Production	Shipments
1939	7,035,671	50,648,556	51,190,314
1940	7,016,948	52,237,003	52,214,079
1941	4,678,407	57,382,118	59,689,072
1941			
Jan.	7,632,655	5,112,824	4,473,942
Feb.	7,924,383	4,887,190	4,610,313
Mar.	8,068,646	5,349,202	5,181,198
Apr.	8,142,692	5,480,933	5,358,351
May	7,086,194	5,839,405	6,310,202
June	7,010,100	6,263,876	6,908,434
July	6,356,726	5,278,207	5,916,587
Aug.	6,071,075	4,435,690	4,779,735
Sept.	5,430,556	4,143,303	4,792,126
Oct.	4,447,558	4,137,200	5,143,304
Nov.	4,377,171	3,724,790	3,824,665
Dec.	4,678,407	2,729,498	2,390,215

	Inner Tubes		
	Original Equipment	Replacement Sales	Export Sales
1939	18,190,630	31,997,906	1,001,778
1940	22,172,452	29,069,547	972,080
1941	24,722,066	33,737,494	1,229,572
1941			
Jan.	2,281,274	2,082,311	110,357
Feb.	2,545,877	1,932,703	131,733
Mar.	2,647,533	2,405,927	127,738
Apr.	2,334,612	2,908,490	115,249
May	2,686,450	3,496,860	126,892
June	2,590,029	4,205,944	112,461
July	2,004,778	3,804,770	107,039
Aug.	1,114,325	3,552,979	112,431
Sept.	1,459,060	3,235,382	97,684
Oct.	1,982,061	3,072,028	89,215
Nov.	1,784,998	1,976,792	62,875
Dec.	1,291,009	1,063,308	35,898

Source: The Rubber Manufacturers Association, Inc. Figures adjusted to represent 100% of the industry.

Stanco Distributors, Inc., 26 Broadway, New York, N. Y., appointed H. M. Royal, Inc., 4814 Loma Vista Ave., Los Angeles, Calif., its Pacific Coast agent for the sale of Perbunan synthetic rubber, starting January 1, 1942. Stanco will carry a stock of Perbunan in the Westland Warehouse in Los Angeles for the convenience of coast customers, and all inquiries should be addressed to the Royal company.

COTTON AND FABRICS

NEW YORK COTTON EXCHANGE WEEK-END CLOSING PRICES

Futures	Nov. 29	Dec. 27	Jan. 3	Jan. 10	Jan. 17	Jan. 24
Jan.	16.20	16.56	17.40	17.62	.....	.....
Feb.	.....	.....	17.59	17.76	18.11	18.97
Mar.	16.42	16.96	17.79	17.88	18.20	19.06
July	16.53	17.16	18.01	18.20	18.47	19.31
Sept.	16.55	17.17	18.02	18.23	18.55	19.39
Dec.	.....	.....	18.07	18.28	18.63	19.48

New York Quotations

January 26, 1942

Drills

38-inch 2.00-yard ..... yd.	....
40-inch 3.47-yard	....
50-inch 1.52-yard	$0.31
52-inch 1.85-yard	.25⅝
52-inch 1.90-yard	.24⅜/.25
52-inch 2.20-yard	.22¼
52-inch 2.50-yard	.19⅝
59-inch 1.85-yard	.25

Ducks

38-inch 2.00-yard D. F..... yd.	.22½/.23
40-inch 1.45-yard S. F.....	.30⅝
51½-inch 1.35-yard D. F.....	.33⅜
72-inch 1.05-yard D. F.....	.45¾/.50
72-inch 17-21 ounce	.57

Mechanicals

Hose and belting ..... lb.	.48½

Tennis

51¼-inch 1.35-yard ..... yd.	.33¾
51½-inch 1.60-yard ..... yd.	.28¾
51½-inch 1.90-yard ..... yd.	.24½

Hollands—White

Blue Seal

20-inch ..... yd.	....
30-inch	....
40-inch	....

Gold Seal

20-inch No. 72 ..... yd.	....
30-inch No. 72	....
40-inch No. 72	....

Red Seal

20-inch ..... yd.	....
30-inch	....
40-inch	....

Osnaburgs

40-inch 2.34-yard ..... yd.	.15⅝
40-inch 2.48-yard	.14⅝
40-inch 2.56-yard	....
40-inch 3.00-yard	.12⅜
40-inch 7-ounce part waste.....	.15
40-inch 10-ounce part waste.....	.21⅛
37-inch 2.42-yard clean.....	.15

Raincoat Fabrics

Cotton

Bombazine 64 x 60..... yd.	....
Plaids 60 x 48.....	....
Surface prints 64 x 60.....	....
Print cloth, 38½-inch, 64 x 60..	0.8878

Sheetings, 40-Inch

48 x 48, 2.50-yard..... yd.	.15600
64 x 68, 3.15-yard	.13492
56 x 60, 3.60-yard	.11528
44 x 40, 4.25-yard	.09412

Sheetings, 36-Inch

48 x 48, 5.00-yard ..... yd.	.08300
44 x 40, 6.15-yard	.06748

Tire Fabrics

Builder

17¼ ounce 60" 23/11 ply Karded peeler ..... lb.	.45

Chafer

14 ounce 60" 20/8 ply Karded peeler ..... lb.	.44
9¼ ounce 60" 10/2 ply Karded peeler ..... lb.	.44

Cord Fabrics

23/5/3 Karded peeler, 1 1/16" cotton ..... lb.	.45
15/3/3 Karded peeler, 1 1/16" cotton ..... lb.	.43
12/4/2 Karded peeler, 1 1/16" cotton ..... lb.	.44
23/5/3 Karded peeler, 1¼" cotton ..... lb.	.45
23/5/3 Combed Egyptian .... lb.	.45

Leno Breaker

8¼ ounce and 10¼ ounce 60" Karded peeler ..... lb.	.45

SUBSTANTIAL gains were made in the January cotton market. On December 31 1⅛-inch spot middling closed at 18.55¢ per pound on the New York exchange and was quoted at 19.70¢ per pound January 5. Unsettling effects of the decision of the Commodity Credit Corp. to sell some of its holdings caused a drop to 19.23¢ per pound on January 6, but thereafter steady increases were marked. The highest price levels since 1929 were reached on January 22, and 1⅛-inch spot middling was selling at 20.28¢ per pound. The price for this grade on January 29 was 20.49¢ per pound.

The Bureau of the Census reported estimated December cotton consumption at 887,326 running bales, compared with 849,753 bales in November and 777,482 bales in December, 1940. Stocks at mills increased from 2,249,638 bales November 30 to 2,393,782 bales December 31, a new high. Public storage and compresses held 13,713,773 running bales on December 31 against 13,964,018 bales on November 30 and 15,050,823 bales December 31, 1940.

The New York Cotton Exchange Service estimated that about 810,000 bales were used in tire production in 1941. Cotton circles are discussing the effects on cotton consumption of tire and car sales restrictions, and it is believed that cotton consumption in 1942 for tires, passenger cars, and trucks will amount to between 150,000 and 200,000 bales. The war goods production of the rubber industry will call for the use of a considerable amount of cotton fabrics which is expected to offset to some extent the decreased call for tire fabrics.

A domestic cotton consumption far in excess of pre-war estimates may be one of the greatest price-supporting influences for 1942-43 cotton. The farm bloc continues to fight for high ceiling prices, and while no agreement has been reached on the price control bill as this goes to press, there is little likelihood for a ceiling below 110% of parity.

Fabrics

The January fabrics market reflected the trade's concern over accumulating government orders, and trading was largely confined to supplying goods for military uses, although a sharp cotton advance brought out some print goods for civilian consumption. Sheetings were sold in scattered lots; drills and osnaburgs were not freely offered.

In an effort to speed up textile production the government requested mills to inaugurate a three-shift, seven-day week. The OPA announced on January 6 a premium of 1¢ per pound on drill for army clothing and increased ceilings on certain types of cotton yarn and gray goods. It is thought that textile rationing is not far distant because of the scheduled large increases in the size of the army. War uses, it is predicted, will absorb about 50% of cloth production.

The OPM on January 15 directed all cotton duck manufacturers to use their entire capacity for military goods and prohibited the acceptance of civilian contracts. Tire cord mills that can be converted to duck production are covered by the program, it was stated.

In 1941 cotton mills consumed more than 10 million bales of cotton and produced an estimated 12 billion square yards of cloth, the Cotton Textile Institute reported. This was a 20% increase over 1940 and a 33% increase over a typically normal year.

Amendment No. 4 to Price Schedule No. 35 (OPA) issued January 22 and effective January 23 placed ceilings on clean osnaburgs and revised ceilings on five grades of part waste osnaburgs keyed to market prices of raw spot cotton. Clean osnaburgs carry premiums of 1½¢ and 2¢ per pound over the part waste maximum prices.

Tire fabric prices are up 1¢ per pound. Drills have increased from ¾¢ to 1¢ per yard, and ducks from ½¢ to 1½¢ per yard. Some grades of sheetings are ½¢ to ⅝¢ per yard higher than last month.

Head of New York Group

(*Continued from page* 492)

radio. In fact Mr. Traflet was an instructor with the United States Signal Corps during the first World War. Besides he has owned and operated a licensed radio transmitter since 1913. He also belongs to the Masons, Rotary Club, American Legion, and American Chemical Society. He is one of the most active and one of the original members of the New York Group and has served on several of its committees. Recently he was elected to the board of The Rubber Reclaimers Association, Inc.

Mr. Traflet is married and has three children, Robert, aged 9, Margaret, 7, and Donald, 5.

The Boston Group, Division of Rubber Chemistry, A. C. S., will hold its first 1942 meeting early in April.

Rubber and Canvas Footwear Statistics

	Thousands of Pairs		
	Inventory	Production	Shipments
1938	16,183	50,812	54,942
1939	16,388	60,612	60,377
1940	11,129	57,278	62,480
1941			
Jan.	10,377	5,939	6,614
Feb.	10,754	5,543	5,166
Mar.	11,222	5,827	5,359
Apr.	12,272	6,628	5,555
May	13,223	6,084	5,134
June	13,834	6,278	5,668
July	12,256	4,789	6,366
Aug.	10,809	5,543	6,990
Sept.	9,228	5,844	7,422
Oct.	8,650	6,848	7,433
Nov.	8,725	6,362	6,287

The above figures have been adjusted to represent 100% of the industry based on reports received which represented 81% for 1936-37.
Source: *Survey of Current Business*, Bureau of Foreign & Domestic Commerce, Washington, D. C.

LIGHT—FAST—and EFFECTIVE is as good a way as any to tell the story of the Army's new 37 mm. light, anti-tank gun which fires a one pound shell capable of penetrating an inch and a half of armor steel. This very mobile and very potent gun may be destined to play an important role in our defense efforts. The 37 mm. anti-tank gun and crew can go into action such as we depict above on a remarkably short notice.

Here again, cotton plays an important part in our defense in equipping and protecting both men and guns — breech and muzzle covers for the guns as well as uniforms and equipment for the men. Because so many of our fabrics are needed in such large quantity for such things as gun covers, knapsacks, tents, tarpaulins, leggings and uniforms, your normal supply of HOSE and BELTING DUCK may be somewhat limited during the present emergency.

WELLINGTON SEARS COMPANY • 65 Worth Street, New York, N. Y.

Cottons FOR DEFENSE...WELLINGTON SEARS FOR *Cottons*

OPA State Quotas for New Tires and Tubes during January, 1942

States	Passenger Cars, Motorcycles, and Light Trucks		Trucks and Buses	
	Tire Quota	Tube Quota	Tire Quota	Tube Quota
Alabama	2,906	2,432	3,680	3,076
Alaska	33	28	72	60
Arizona	704	589	1,426	1,192
Arkansas	1,158	969	2,346	1,961
California	8,995	7,529	18,669	15,607
Colorado	1,125	942	2,596	2,170
Connecticut	1,306	1,093	3,014	2,520
Delaware	210	176	484	405
District of Columbia	572	479	1,350	1,129
Florida	4,068	3,403	7,840	6,554
Georgia	4,140	3,466	7,980	6,671
Hawaii	209	175	495	414
Idaho	448	376	1,034	864
Illinois	5,320	4,453	12,555	10,496
Indiana	2,717	2,274	6,413	5,361
Iowa	2,174	1,819	5,130	4,289
Kansas	2,088	1,748	4,232	3,358
Kentucky	1,600	1,340	3,172	2,652
Louisiana	2,833	2,372	3,588	3,000
Maine	534	447	1,232	1,030
Maryland	1,239	1,037	2,925	2,445
Massachusetts	2,669	2,234	6,160	5,150
Michigan	3,985	3,336	9,196	7,688
Minnesota	1,811	1,516	4,180	3,494
Mississippi	1,961	1,641	3,780	3,160
Missouri	3,525	2,951	6,739	5,634
Montana	515	431	1,188	993
Nebraska	1,125	942	2,655	2,220
Nevada	210	176	484	405
New Hampshire	353	295	814	681
New Jersey	2,717	2,274	6,413	5,361
New Mexico	658	551	1,334	1,115
New York	7,427	6,216	17,527	14,653
North Carolina	2,871	2,403	5,819	4,865
North Dakota	438	367	1,012	846
Ohio	5,053	4,229	11,925	9,969
Oklahoma	2,474	2,071	5,014	4,192
Oregon	1,546	1,294	3,209	2,683
Pennsylvania	6,207	5,195	14,647	12,245
Puerto Rico	142	119	312	261
Rhode Island	496	415	1,170	978
South Carolina	1,441	1,206	2,921	2,442
South Dakota	486	407	1,148	959
Tennessee	2,088	1,748	4,232	3,538
Texas	12,530	10,488	24,150	20,189
Utah	534	447	1,260	1,053
Vermont	257	215	594	497
Virginia	1,745	1,460	4,118	3,442
Washington	1,487	1,245	3,432	2,869
West Virginia	1,049	878	2,475	2,069
Wisconsin	1,764	1,476	4,070	3,403
Wyoming	248	207	572	478
Grand total	114,191	95,580	242,783	202,966

Rubber Trade Inquiries

The inquiries below are of interest not only in showing the needs of the trade, but because additional information may be furnished by readers. The Editor is glad to have those interested communicate with him.

No.	Inquiry
2861	Suppliers of sponge-rubber backed carpeting for auto floors.
2862	Manufacturers of hose for grease guns.
2863	Manufacturers of equipment for printing rubber balloons.
2864	Manufacturers of refrigerator equipment for cooling circulating water through mill rolls.
2865	Manufacturers of latex dipping machines.
2866	Manufacturers of tire retreading equipment.
2867	Manufacturers of sponge rubber in the United States and South America.

Holt on Mexican Guayule

In the *Domestic Commerce Weekly* of January 8, 1942, E. G. Holt points out that the wild guayule shrub in Mexico is perhaps capable of supporting an annual production of 4,000 tons for an indefinite period through regrowth. Complete exploitation to exhaustion might yield 25,000 tons of guayule rubber in a three-year period, Mr. Holt writes. Mexico has used an average of near 4,000 tons annually of imported plantation rubber, less than half being bought in the United States.

Wild Rubber Discussed

The *Domestic Commerce Weekly*, January 8, 1942, in discussing the possibilities of wild rubber from tropical America, states that only about 55,000 tons of tree rubber (omitting guayule) were produced there in the best year of the boom times, around 1910. The total was only 20,473 tons in 1921 and rose gradually to 31,236 in 1927. The depression year 1932 brought total exports down to only 6,500 tons, but there has been a gradual increase since then to 17,600 tons for 1940. According to the article, price stimulation so implemented as to give greater revenue to the collectors, as well as to the traders, could increase output again, perhaps up to 35,000 tons, but only gradually over a period of three years or more.

United States Statistics

Imports for Consumption of Crude and Manufactured Rubber

	September, 1941 Quantity	September, 1941 Value	Nine Months Ending September, 1941 Quantity	Nine Months Ending September, 1941 Value
UNMANUFACTURED—*Free*				
Liquid latex (solids).....*lb.*	8,084,362	$1,795,345	46,534,487	$9,280,551
Jelutong or pontianak.....*lb.*	978,361	140,412	12,300,659	1,789,227
Balata .....*lb.*	254,830	38,632	1,298,421	257,326
Gutta percha .....*lb.*	433,920	57,151	2,752,065	423,703
Guayule .....*lb.*	739,900	79,054	7,919,730	812,966
Scrap and reclaimed .....*lb.*	1,890,347	58,837	13,845,812	339,512
Crepe soled rubber.....*lb.*	9,088	1,877	300,679	67,493
Totals	12,390,808	$2,171,308	84,951,853	$12,970,779
Misc. rubber (above), 1,000 *lbs.*	12,391	$2,171,308	84,952	$12,970,779
Crude rubber .....1,000 *lbs.*	177,434	33,045,295	1,656,877	301,224,726
Totals .....1,000 *lbs.*	189,825	$35,216,603	1,741,829	$314,195,504
Chicle, crude .....*lb.*	925,186	$344,469	10,991,963	$4,060,170
MANUFACTURED—*Dutiable*				
Rubber tires .....*no.*	28	$173	4,017	$68,221
Rubber boots, shoes and overshoes .....*prs.*	1,644	1,962	21,098	9,183
Rubber soled footwear with fabric uppers .....*prs.*	8,579	3,414	603,779	120,961
Golf balls .....*no.*	28,204	5,195	374,476	43,865
Lawn tennis balls .....*no.*	3,600	406	228,936	31,320
Other rubber balls.....*no.*	407,188	5,426	1,659,246	31,763
Other rubber toys.....	.....	76	.....	7,279
Hard rubber combs.....*no.*	.....	.....	.....	.....
Other manufactures of hard rubber	.....	188	.....	372
Friction or insulating tape.*lb.*	.....	.....	23,909	16,049
Belts, hose, packing, and insulating material	.....	25,539	.....	87,637
Druggists' sundries of soft rubber	.....	32	.....	4,015
Inflatable swimming belts, floats, etc. .....*no.*	4,440	444	240,286	22,333
Other rubber and gutta percha manufactures	.....	14,767	.....	104,719
Totals	.....	$57,622	.....	$547,717

Exports of Foreign Merchandise

RUBBER AND MANUFACTURES				
Crude rubber .....*lb.*	1,678,174	$402,036	9,346,910	$2,116,945
Balata .....*lb.*	3,470	916	187,038	73,250
Other rubber, rubber substitutes and scrap.....*lb.*	.....	.....	17,731	4,863
Rubber manufactures (including toys)	.....	14,454	.....	168,639
Totals	.....	$417,406	.....	$2,363,697

Exports of Domestic Merchandise

RUBBER AND MANUFACTURES				
Reclaimed .....*lb.*	2,395,204	$128,265	20,137,785	$1,143,769
Scrap .....*lb.*	1,010,472	14,998	37,621,543	551,708
Cements .....*gal.*	23,596	22,892	237,552	229,431
Rubberized auto cloth..*sq. yd.*	21,160	11,611	233,304	107,338
Other rubberized piece goods and hospital sheetings..*sq. yd.*	297,302	109,981	2,729,098	1,167,615
Boots .....*prs.*	3,823	9,365	63,300	150,090
Shoes .....*prs.*	18,446	14,007	153,516	113,243
Canvas shoes with rubber soles .....*prs.*	91,433	67,700	689,494	541,697
Soles .....*doz. prs.*	5,161	8,269	61,401	92,920
Heels .....*doz. prs.*	25,188	15,133	238,395	131,697
Soling and top lift sheets..*lb.*	64,970	21,781	358,485	98,904
Gloves and mittens *doz. prs.*	7,656	18,192	86,102	176,382
Water bottles and fountain syringes .....*no.*	40,364	19,388	390,121	133,530
Other druggists' sundries.....	.....	106,024	.....	820,775
Gum rubber clothing.....*doz.*	14,996	31,896	139,782	358,928
Balloons .....*gross*	28,821	38,042	193,228	184,951
Toys and balls	.....	24,854	.....	130,253
Bathing caps .....*doz.*	3,417	6,265	35,022	62,828
Bands .....*lb.*	9,021	4,068	109,729	50,163
Erasers .....*lb.*	19,230	10,681	180,925	102,221
Hard rubber goods				
Electrical battery boxes..*no.*	17,306	12,919	222,164	167,761
Other electrical .....*lb.*	40,543	11,143	362,188	116,206
Combs, finished .....*doz.*	22,389	12,961	288,373	149,381
Other hard rubber goods.....	.....	20,828	.....	170,273
Tires				
Truck and bus casings..*no.*	49,526	1,107,450	552,705	12,767,504
Other auto casings.....*no.*	57,575	738,335	553,039	6,905,189
Tubes, auto .....*no.*	73,280	153,496	816,891	1,826,702
Other casings and tubes..*no.*	27,713	207,602	188,736	1,870,864
Solid tires for automobiles and motor trucks....*no.*	408	12,046	3,135	79,906
other solid tires.....*lb.*	292,095	41,837	838,899	129,276
Tire sundries and repair materials .....*lb.*	232,890	84,293	2,187,924	673,799
Rubber and friction tape *lb.*	61,267	18,940	557,032	163,891
Fan belts for automobiles..*lb.*	61,169	30,948	395,010	193,884
Other rubber and balata belts .....*lb.*	143,020	98,295	2,447,682	1,323,213
Garden hose .....*lb.*	38,960	8,212	464,534	90,840
Other hose and tubing....*lb.*	580,213	266,095	5,440,575	2,452,956
Packing .....*lb.*	161,913	82,114	1,263,668	555,599
Mats, matting, flooring, and tiling .....*lb.*	119,265	16,086	1,086,846	153,599
Thread .....*lb.*	26,943	33,713	246,198	239,012
Gutta percha manufactures.*lb.*	45,272	20,623	406,845	142,983
Latex (d.r.c.) and rubber sheets processed for further manufacture .....*lb.*	433,485	94,934	1,863,379	388,930
Synthetic rubber (bulk)...*lb.*	43,449	23,227	737,269	379,105
Other rubber manufactures..	.....	173,050	.....	1,490,132
Totals	.....	$3,952,568	.....	$38,779,438

Dominion of Canada Statistics

Imports of Crude and Manufactured Rubber

	November, 1941 Quantity	November, 1941 Value	Eleven Months Ending November, 1941 Quantity	Eleven Months Ending November, 1941 Value
UNMANUFACTURED				
Crude rubber, etc.....*lb.*	4,943,592	$1,032,748	137,930,214	$29,658,703
Latex (dry weight) .....*lb.*	563,405	180,039	4,729,546	1,452,032
Gutta percha .....*lb.*	.....	.....	25,895	16,500
Rubber, recovered .....*lb.*	1,557,100	101,764	16,823,800	984,621
Rubber, powdered, and gutta percha scrap .....*lb.*	569,800	22,915	6,350,600	143,821
Balata .....*lb.*	150	215	61,527	18,414
Rubber substitute .....*lb.*	94,700	29,996	608,000	191,088
Totals	7,728,747	$1,367,677	166,529,582	$32,465,179
PARTLY MANUFACTURED				
Hard rubber comb blanks....	.....	$2,510	.....	$36,842
Hard rubber, n. o. s.....*lb.*	3,963	4,581	50,866	48,112
Rubber thread not covered.*lb.*	3,166	3,157	43,999	44,315
Totals	7,129	$10,248	94,865	$129,269
MANUFACTURED				
Bathing shoes .....*prs.*	.....	.....	35,177	$7,134
Belting	.....	$15,351	.....	181,525
Hose	.....	49,262	.....	312,864
Packing	.....	8,587	.....	111,205
Boots and shoes .....*prs.*	1,457	1,887	9,401	16,537
Canvas shoes with rubber soles .....*prs.*	12	24	34,416	13,910
Clothing, including waterproofed	.....	2,635	.....	38,011
Raincoats .....*no.*	3,584	20,583	59,078	243,790
Gloves .....*doz. prs.*	85	658	1,580	6,076
Hot water bottles.....	.....	392	.....	7,922
Liquid sealing compound	.....	7,003	.....	88,821
Tires, bicycle .....*no.*	1,634	1,124	21,930	16,384
Pneumatic .....*no.*	1,125	22,905	25,375	610,592
Solid for automobiles and motor trucks .....*no.*	8	593	381	19,305
Other solid tires	.....	2,304	.....	23,233
Inner tubes .....*no.*	401	692	15,179	52,143
Bicycle .....*no.*	274	78	15,693	4,464
Mats and matting	.....	17,625	.....	133,074
Cement	.....	20,408	.....	162,051
Golf balls .....*doz. prs.*	700	1,063	18,927	36,395
Heels .....*prs.*	7,587	553	85,825	6,002
Other rubber manufactures..	.....	298,765	.....	2,458,443
Totals	.....	$472,582	.....	$4,549,881
Totals, rubber imports..	.....	$1,850,507	.....	$37,144,329

Exports of Domestic and Foreign Rubber Goods

	Produce of Canada Value	Reexports of Foreign Goods Value	Produce of Canada Value	Reexports of Foreign Goods Value
UNMANUFACTURED				
Crude rubber	.....	.....	$73	.....
Waste rubber	$37,465	.....	321,041	.....
MANUFACTURED				
Belting	$68,720	.....	$513,456	.....
Bathing caps	520	.....	4,158	.....
Canvas shoes with rubber soles.	27,336	.....	367,321	.....
Boots and shoes	270,041	.....	1,852,518	.....
Clothing, including waterproofed	41,933	.....	297,873	.....
Heels	2,522	.....	24,179	.....
Hose	82,717	.....	2,056,844	.....
Soles	1,213	.....	15,994	.....
Soling slabs	.....	.....	9,049	.....
Tires, pneumatic	1,217,717	.....	5,872,982	.....
Not otherwise provided for.	14,078	.....	708,637	.....
Inner tubes	102,904	.....	579,362	.....
Other rubber manufactures..	110,887	.....	563,280	.....
Totals	$1,940,648	.....	$12,865,653	.....
Totals rubber exports...	$1,978,113	.....	$13,186,767	.....

Dividends Declared

COMPANY	STOCK	RATE	PAYABLE	STOCK OF RECORD
Dayton Rubber Mfg. Co.....	"A"	$0.50 q.	Feb. 16	Feb. 2
Detroit Gasket & Mfg. Co...	6% Cum Pfd.	$0.30 q.	Mar. 2	Feb. 13
DeVilbiss Co.	Com.	$0.50	Jan. 15	Dec. 29
DeVilbiss Co.	7% Pfd.	$0.175 q.	Jan. 15	Dec. 29
General Cable Corp.	Pfd.	$1.75 accum.	Mar. 3	Jan. 26
Hercules Powder Co.	6% Pfd.	$1.50 q.	Feb. 13	Feb. 3
Midwest Rubber Reclaiming Co.	Com.	$0.50 irreg.	Feb. 2	Jan. 21
National Automotive Fibres, Inc.	6% Cv. Pfd. ($10)	$0.15 q.	Mar. 2	Feb. 10
Philadelphia Insulated Wire Co.	Com.	$0.50 s. (inc.)	Feb. 16	Feb. 2
S. S. White Dental Mfg. Co.	Com.	$0.30	Feb. 14	Jan. 30

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ALL CLASSIFIED ADVERTISING MUST BE PAID IN ADVANCE

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Light face type 75c per line (ten words)
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Allow nine words for keyed address. *Replies forwarded without charge*

SITUATIONS WANTED

RUBBER COMPOUNDER, 14 YEARS' EXPERIENCE in reclaim manufacturing, soles and heels, sundries, synthetics, mechanicals, belts, hose, molded goods, plumbing supplies, insulated wire, hard rubber combs, tubes, and rods. Young—able—energetic—resourceful—reliable—married—go anywhere in U. S. A. Address Box No. 372, care of INDIA RUBBER WORLD.

RUBBER CHEMIST, 4 YEARS' EXPERIENCE IN COMPOUNDING, development, and processing of mechanical goods and sponge, reclaimed and synthetic rubbers, also latex, water dispersions, and adhesives. Address Box No. 376, care of INDIA RUBBER WORLD.

PRACTICAL COMPOUNDER, 35 YEARS' OF EXPERIENCE IN THE production of Mechanical Goods of all kinds, either Gum or all Reclaim Stocks, also in compounding and processing Synthetic Rubbers, and have process for Reclaiming Scrap to produce a high-grade of Reclaim at low cost; expert in laboratory and production control. Can furnish references from previous employers. Address Box No. 378, care of INDIA RUBBER WORLD.

SUPERINTENDENT NOW EMPLOYED DESIRES CHANGE. 20 years' experience with large and small manufacturers of mechanical, sponge, and synthetic rubber goods. Also capable as technical supervisor of development work and compounding. Expert in use of reclaimed rubber to replace crude rubber. Address Box No. 380, care of INDIA RUBBER WORLD.

CHEMIST WITH OVER TWENTY YEARS OF EXPERIENCE IN laboratory, factory, and management in several branches of the rubber industry manufacturing a variety of rubber products seeks a position in the industry. Address Box No. 384, care of INDIA RUBBER WORLD.

SITUATIONS OPEN

SUPERINTENDENT TO TAKE FULL CHARGE OF SMALL MODern reclaimed rubber plant. Give full particulars as to experience. Address Box No. 370, care of INDIA RUBBER WORLD.

TWO FOREMEN: ONE THOROUGHLY EXPERIENCED IN PRECision molding of all kinds of molded rubber articles; also a highly experienced Foreman in general calender work, milling, sheeting, frictioning, backing, etc. State full details. Address Box No. 371, care of INDIA RUBBER WORLD.

INTERESTED IN SERVICES OF EXPERIENCED EXTRUDING machine and rubber mill operator who has some background in drafting and development work. Address Box No. 373, care of INDIA RUBBER WORLD.

WANTED: RUBBER CHEMIST EXPERIENCED IN TIRE COMpounding and processing for technical service work on carbon black. Address Box No. 375, care of INDIA RUBBER WORLD.

WANTED: EXPERIENCED RUBBER CHEMIST WITH THOROUGH background of latex compounding and synthetics. Address Box No. 379, care of INDIA RUBBER WORLD.

WANTED: CHEMIST WITH EXPERIENCE PRODUCING SYNthetic Rubber. Good opportunity for capable man. Give past experience and former employment. Address Box No. 381, care of INDIA RUBBER WORLD.

MECHANICAL GOODS FACTORY IN EAST REQUIRES SERVICES of rubber chemist with several years' experience in hose compounding and construction work. Address Box No. 382, care of INDIA RUBBER WORLD.

WANTED: RUBBER CHEMIST—FOR DEVELOPMENT AND REsearch—leading progressive Eastern company offers good opportunity to man possessing initiative and several years of experience in compounding and testing of rubber and synthetic rubbers. State age, experience, and salary expected. Address Box No. 385, care of INDIA RUBBER WORLD.

MACHINERY AND SUPPLIES FOR SALE

FOR SALE: 1—Watson-Stillman Hydro-Pneumatic Accumulator; 1—5 ft. dia. Vulcanizer, with quick-opening door; 20—Semi-automatic Hydraulic Presses; 1—Birmingham 16″x36″ Rubber Mill, m.d.; 6—30″x40″, 1—38″x78″ Hydraulic Presses; Hydraulic Pumps, Calenders, Tubers, etc. CONSOLIDATED PRODUCTS CO., INC., 13-16 Park Row, New York, N. Y.

FOR SALE: Mikro Pulverizers; W. & P. Mixers; Brighton 80 gal. Change Can Mixers; Pony Mixers; Driers, etc. Cash Buyers of your surplus equipment—from single items to complete plants. BRILL EQUIPMENT CORPORATION, 183 Varick Street, New York City.

20—48″ QUICK-OPENING STEEL DOORS THAT WERE USED ON pot-type Vulcanizers; 1—10″ Erie Strainer; 4—7″ Allen Strainers; 2—24x30 four-opening Hydraulic Presses, 12″ rams; 3 Accumulators; 4—30x30 Hydraulic Presses, 16″ rams; 1—30x30 H.P.M. Press, 18″ ram; 2—42″ Mills; 1—36″ Mill; 1—54″ Calender; 1—5′x27′ Vulcanizer. Address Box No. 377, care of INDIA RUBBER WORLD.

MACHINERY AND SUPPLIES WANTED

WANTED: 1—Banbury Mixer; 2—Mills; 1—Calender; 5—Hydraulic Presses, with pump and accumulator; 2—Tubers. Address Box No. 383, care of INDIA RUBBER WORLD.

EQUIPMENT WANTED: We are in the market for all or part of the following equipment: scrap cutter, a rubber grinder, refiner, 23 or 24 tubing machine; give us best price and delivery. Address MUTUAL RUBBER CO., 225 Lafayette St., New York, N. Y.

BUSINESS OPPORTUNITY

SPECIALIST IN MANUFACTURING COATED FABRICS FOR Raincoat and Shoe trade. Address Box No. 374, care of INDIA RUBBER WORLD.

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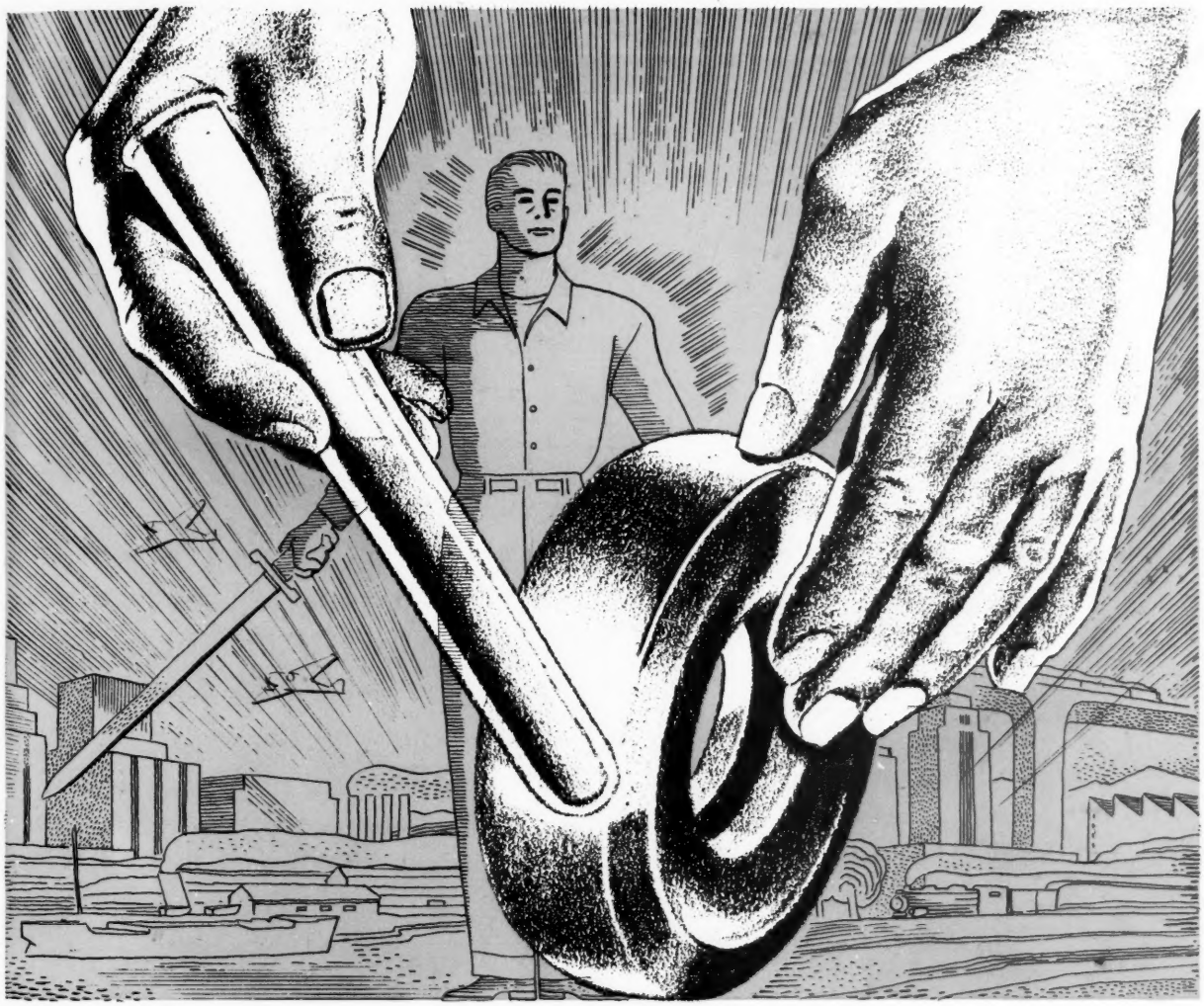

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And in no division of industry has this genius been more evident than in Rubber . . . an industry whose research brains have found vital uses for the once-scorned sap of a tropical tree in every phase of modern life.

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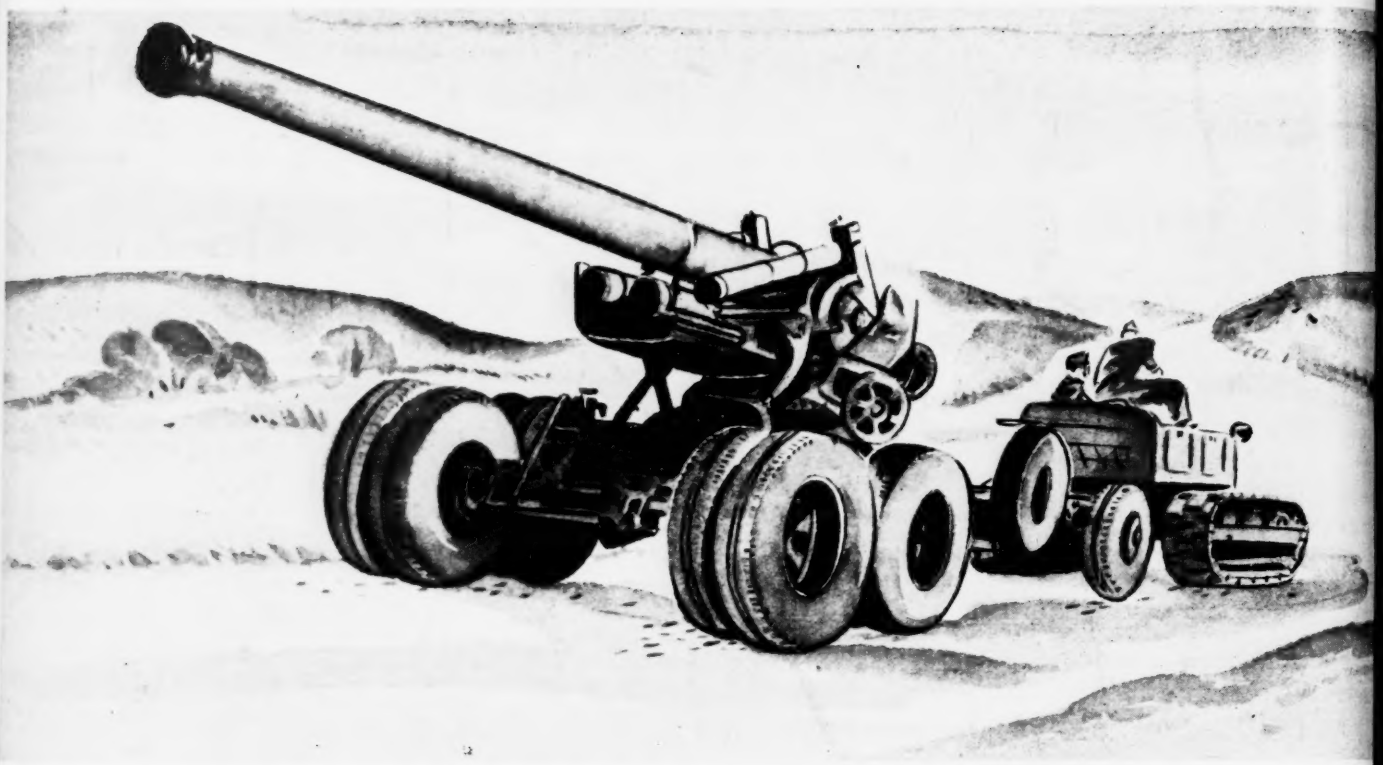

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